

Evaluating the marketing opportunities for *Shea* nut and *Shea* nut processed products in Uganda

R.S.B Ferris, C. Collinson, K. Wanda,
J. Jagwe, and P Wright



About ASARECA

The Association for Strengthening Agricultural Research in Eastern and Central Africa (ASARECA) is a nonpolitical organization of the National Agricultural Research Institutes (NARIs) of ten countries: Burundi, D.R. Congo, Eritrea, Ethiopia, Kenya, Madagascar, Rwanda, Sudan, Tanzania, and Uganda. It aims at increasing the efficiency of agricultural research in the region so as to facilitate economic growth, food security, and export competitiveness through productive and sustainable agriculture.

Background

The background to regional collaboration in agricultural research can be traced to the early 1980s when scientists from the national programs began working together. To run these networks, regional steering committees were put in place to consider and approve annual work plans. Membership was drawn from the national coordinators for research, as well as the scientists from the international research centers. With time, these early networks evolved and came to be regarded as one way of achieving economies of scale and facilitating technology spill-overs across national boundaries. It was upon this that the idea of a regional association was initiated and built on.

Given the many commodities and factors which each national system had to handle and the need for increased efficiency and effectiveness in utilizing scarce resources, it was agreed that a regional strategy for agricultural research and research-related training be implemented. So, in September 1994, the Memorandum of Agreement that established ASARECA was signed and in October, that same year, the Executive Secretariat became operational and it is based in Entebbe, Uganda. The directors of the National Agricultural Research Institutes in the ten member countries constitute the Committee of Directors, which is the highest governing body. The Committee provides policy oversight while the Executive Secretary services it and implements its decisions under the guidance of the Chairman.

Research Networks

ASARECA carries out its activities through regional research networks, programs, and projects. Twelve of these are currently operational with seven due to begin operations in the next several months. However, it is important to note that before ASARECA came into existence, there was already some collaborative research within the region. This was brought under the ambit of ASARECA when it was established and it is carried out by the first-generation networks. These are the research networks on potato and sweet potato, agroforestry, root crops, and beans. The second-generation networks are those established in 1990s; they are the research networks on banana, postharvest processing, animal agriculture, maize and wheat, highlands, technology transfer, agricultural policy analysis, and electronic connectivity. The new networks under planning are those on rice, plant genetic resources, sorghum and millet, soil and water conservation, coffee, agricultural information, and strengthening the capacity of NARIs to manage regional programs.

Evaluating the marketing opportunities for *Shea* nut and *Shea* nut processed products in Uganda

R.S.B. Ferris, C. Collinson, K. Wanda,
J. Jagwe, and P. Wright

Prepared by IITA-FOODNET, CIP, PRAPACE, CGIAR,
and ASARECA

© International Institute of Tropical Agriculture (IITA), 2003
Ibadan, Nigeria
Telephone: (234 2) 241 2626
Fax: (234 2) 241 2221
E-mail: iita@cgiar.org
Web: www.iita.org

To Headquarters from outside Nigeria:
c/o Lambourn (UK) Ltd Carolyn House
26 Dingwall Road, Croydon CR9 3EE, UK

Within Nigeria:
PMB 5320, Oyo Road
Ibadan, Oyo State

ISBN 978 131 223 8

Printed in Nigeria by IITA

Correct citation: R.S.B. Ferris, C. Collinson, K. Wanda, J. Jagwe, and P. Wright. 2004. Evaluating the marketing opportunities for *Shea* nut and *Shea* nut processed products in Uganda. ASARECA/IITA Monograph 5. Ibadan, Nigeria. 96 pp.

Contents

Acronyms and abbreviations.....	vi
Executive summary	vii
Background	1
<i>Shea</i> production potential in Africa.....	2
Global <i>Shea</i> markets	3
Demand and marketable attributes of <i>Shea</i> high-value products	3
Production method.....	4
Consumption	4
Main market features.....	5
Supply	5
Grades	5
Chemical composition of the nut across Africa	6
Market development in producer countries.....	7
The natural <i>Shea</i> resource in Uganda.....	14
Estimates of potential Uganda <i>Shea</i> supply	15
The role of <i>Shea</i> nuts in the Uganda household economy	20
<i>Shea</i> nut in Uganda	20
Traditional processing techniques	20
Gender	22
Importance to household diet, income, and food security.....	22
Comparison with <i>Shea</i> nut and butter industries and markets in West Africa	23
The experience in West Africa	23
International trade	23
Small and medium enterprise (SME) <i>Shea</i> butter extraction in Ghana	25
The interaction between industrial and traditional <i>Shea</i> activities.....	25
<i>Shea</i> product market reviews	26
Traditional <i>Shea</i> nut market	26
Market share of <i>Shea</i> compare with refine oils.....	26
Trading chain.....	29
Whole salaing profitability	31
Expansion:Implications for traditional <i>Shea</i> oil processing	33
Traditional crude <i>Shea</i> oil market,quantity, quality and substitutes	33
Processing techniques and profitability.....	34
Marketing systems (including estimated margins in the supply chain).....	37
Potential for <i>Shea</i> olein within the Uganda market for cooking oils	39

Crude <i>Shea</i> oil and olein	39
Economic implications in northern Uganda.....	40
Reactions to <i>Shea</i> as oil and cosmetics products	41
Detailed findings: cosmetics.....	43
<i>Shea</i> product—cooking—oil.....	49
<i>Shea</i> butter uses and concentrations	51
Supply and demand in the world market.....	52
Ugandan <i>Shea</i> oil	53
The market for cocoa butter equivalents.....	54
Case study	57
Small-scale oil mill, Northern Uganda	57
Main findings and conclusions from the survey	60
Recommendations	65
Future Strategies	68
References	70
Annexes	
1. Stearic acid and sodium stearate/oleic acid	72
2. <i>Shea</i> nut	76
3. Importers	79
4. <i>Shea</i> processing financial workings for Guru Nanak Oil Mills, Lira.	82

Tables

1. Fatty acid profiles: <i>Shea</i> butter compared with competing oils.....	6
2. Mean numbers of trees maintained on farmed parklands across Africa	14
3. Distribution of tree density by land use.....	14
4. <i>Shea</i> density of trees according to zones on map by area (km and ha)	18
5. Tree density based on high and low density ranges	18
6. Estimate of nut production in northern Uganda based on tree density	18
7. Potential oil supplies at an extraction rate of 20% using traditional techniques	18
8. Potential oil supplies at an extraction rate of 30% using improved techniques	19
9. Utilization of the <i>Shea</i> tree	21
10. Quantities of <i>Shea</i> nuts traded in 6 districts of northern Uganda	27
11. <i>Shea</i> nut trading costs and margins	30
12. Lira <i>Shea</i> nut wholesaler—analysis of profitability.....	32
13. Costs, revenues, and profits of a typical crude <i>Shea</i> oil processor	37
14. <i>Shea</i> oil trading costs and margins in the peak season.....	38
15. Options for <i>Shea</i> cosmetics products	52
16. NOM—Analysis of <i>Shea</i> processing profitability.....	58

Figures

1. Distribution of <i>Vitellaria paradoxa</i> subsp <i>paradoxa</i> and <i>V. paradoxa</i> subsp. <i>nilotica</i> in relation to mean annual rainfall (from Hall et al. 1998, <i>Vitellaria paradoxa</i> a Monograph)	2
2. Range of COVOL <i>Shea</i> products	12
3. Density of <i>V. paradoxa</i> in fallow and cultivated land uses	15
4. Main <i>Shea</i> belt in Uganda	16
5. Mapping density zones for <i>Shea</i>	16
6. Distribution of <i>Shea</i> density zones in northern Uganda.....	17
7. Distance from roads in 5 km isolines in northern Uganda.....	17
8. Trading chain for <i>Shea</i> nuts in northern Uganda	29
9. <i>Shea</i> nuts dried for processing	35
10. <i>Shea</i> grounds that are mixed with hot water	35
11. <i>Shea</i> oil screw press	36
12. <i>Shea</i> by-product after pressing.....	36
13. <i>Shea</i> oil trading chain	37

Acronyms and abbreviations

ARD	Associates in Rural Development
AVIS	Brand name for Kampala-based cosmetics company
cif	certified, insured freight
CBE	cocoa butter equivalent
COVOL	Cooperative Office for Voluntary Organizations
fob	free on board
IDEA	Investment in Developing Export Agriculture Program
IITA	International Institute of Tropical Agriculture
INCO	International Cooperation Research Agreement of the European Union <i>Shea</i> project between COVOL, Centre de coopération internationale en recherche agronomique pour le développement, and Bangor University, Wales
NARO	National Agricultural Research Organization of Uganda
NUSPA	Northern Uganda <i>Shea</i> Processors Association
PROPAGE	Association pour la promotion and la propagation de patrimoine végétal des régions arides et semi-arides
UKI	Brand name for a Kampala-based cosmetics company
UOSPA	Uganda Oil Millers and Processors Association
USAID	United States Agency for International Development

Executive summary

1. This study was commissioned to evaluate the economic and environmental prospects for the *Shea* sector of Uganda. Specifically, the study aimed to evaluate the market prospects for a range of products including low value traditional products and high value export *Shea* products in the domestic, national, and international markets.
The study found that *Shea* is a highly valued resource in northern Uganda and that previous financial support by USAID to the *Shea* sector had significantly raised the profile and value given to the *Shea* tree and its products. For women in northern Uganda, *Shea* is a major source of income and consequently any investment that promotes growth in the *Shea* sector is likely to provide considerable benefits to women in one of the poorest areas of the country.
2. *Vitellaria paradoxa*, the *Shea* butter tree, grows throughout “Sudanian” Africa, in a belt from Senegal to Ethiopia. Distribution of the trees is divided with the dominant subspecies, *Vitellaria paradoxa* subsp. *paradoxa*, found in the zone from Senegal to the borders of Sudan, and *Vitellaria paradoxa* subsp. *nilotica*, found in Sudan, Uganda, and Ethiopia.
3. *Shea* trees are truly multipurpose. They are important not only for the economic and dietary value of the cooking-oil but also for the fruit pulp, bark, roots, and leaves used in traditional medicines, and for the wood and charcoal used for building and fuel.
4. European explorers first recorded *Shea* in the early eighteenth century. By the 1920s, a flourishing trade had developed between Western Africa and Europe. However, a combination of changing agricultural production methods, self-sufficiency policies introduced during World War 2, and new product formulations led to a decline in demand. Despite interest by governments and FAO expert panels in developing *Shea* industries, no attempts have been made to domesticate the crop. Essentially, *Shea* remains a wild fruit that is seasonally gathered by local communities.
5. FAO estimates the total African production is approximately 1 760 000 t of *Shea* nuts. From this potential yield, only 35% of the nuts are gathered and 85% of this harvest are locally processed to make 100 000 t/year of local butter. The remaining portion, approximately 65 000 t, is exported, mostly to the food industry. Less than 5% of the exported butter is used in the international cosmetics industry; a probable figure is 3000 t/year.
6. Present industrial demand for *Shea* is as a low cost substitute for cocoa butter in the cocoa butter equivalent (CBE) markets. The bulk of *Shea* exported from West Africa supplies this market. Despite a long-term association with processing markets in Europe, there have been no attempts to domesticate *Shea* and supply through community-based collection systems. Recent changes in EU regulations on the use of substitutes for

cocoa butter increased the demand for *Shea* butter from chocolate confectioners, as it is now possible to blend up to 5% CBEs into chocolate products. The main industrial consumption is in Europe, Japan, and North America.

7. In the past three years there has been renewed interest in *Shea* from high value cosmetics companies. In this market sector, the fact that *Shea* is a wilderness crop that is collected and processed by women's groups in remote rural areas creates a fashionable scenario.
8. Chemical analysis of *Shea* butter extracted from nut samples from four African countries (Uganda, Nigeria, Burkina Faso, and Mali) confirmed considerable variability in the composition of *Shea* oil produced by the subspecies across Africa. The Ugandan sample had a 59% oleic acid content compared with 47% for Nigeria and only 39% for Burkina Faso. From these studies it was found that Malian *Shea* closely resembles cocoa butter and is, therefore, highly suitable for the CBE market, whereas Ugandan *Shea* has more similarities with olive oil. This makes the product highly suitable for use in cosmetics.
9. In West Africa, there have also been some attempts to market local cosmetics products such as "Vaseline *Shea* Butter" in 1996. The commercial success was mixed and the manufacturer has plans to relaunch this product.
10. In comparison with West Africa, the commercial development of *Shea* products in Uganda remains at an embryonic stage. The crop is used as a cooking-oil and market supplies are highly localized. In the Ugandan *Shea* production area, a Vaseline-type product is used for babies. The supply of *Shea* nuts from Eastern Africa is considerably less than from West Africa and there are no statistics available for export.
11. There are numerous reasons why a parallel industrial supply has not emerged in Eastern Africa. The major factors include a significantly lower concentration of trees, high levels of local oil consumption, and a softer *Shea* butter that is not suitable for CBE users. Uganda is landlocked and so has higher transportation costs than coastal countries such as Ghana in West Africa. Lack of security within the Ugandan–Sudanese *Shea* belt has reduced investment and obviously hampers supply chain support and activities. Most importantly, Uganda lacks a traditional partnership between local producers and users in industrialized nations. Despite this somewhat bleak outlook, the market potential for East African *Shea* is not entirely without prospects as its qualities are suited to the high value cosmetics market.
12. Results from this survey estimate that potential levels of *Shea* nut production in Uganda range from approximately 70 000 to 385 000 t/year. This would yield between 15 and 80 million liters of oil using traditional methods at a value of US\$30 million, increasing to more than 120 million liters with improved extraction techniques. However, most of the nuts are not harvested and hence the value of the market is considerably less than its potential.
13. Even with a low level of collection, *Shea* oil plays a significant role in the household food and income security of northern Uganda, especially in the districts of Lira, Katakwi, Kitgum, and Kotido. The crop is a particularly important source of income for rural women and children. Interviews revealed that women processors rated *Shea* oil as the

highest source of income generation, providing more income than brewing and farming. The money made through *Shea* is also held by women, whereas much of a woman's labor goes into agricultural products that are sold by the head of the family, usually a man. *Shea* nut wholesalers, all men, also indicated that trading in *Shea* was highly lucrative with gains being higher than from other crops such as sunflower, groundnut, and maize.

14. The *Shea* region is located in the poorest area of Uganda. Therefore, any increases in income through interventions that increase the demand for *Shea* in this region will have significant economic and social benefits.
15. To develop the *Shea* market in Uganda, some important issues should be taken into consideration.
 - Developing personal contacts with buyers is essential. Links with overseas industries are well established in West Africa and similar contacts will have to be built in East Africa if development of the *Shea* subsector is to occur.
 - Scale of output, quality, and cost must be matched to market requirements. Cosmetics buyers require small quantities but pay high prices, whereas CBE buyers require large quantities but pay relatively lower prices. As Uganda is unlikely to compete in the CBE market, the emphasis for future technical development should target the cosmetics market.
 - In Ghana, the experience of a subsidiary of a major international company in producing a mass-market skin moisturizing product containing *Shea* butter points to the potential of exploiting regional cosmetics markets. East Africa's large-scale cosmetics industry is well developed and has the capacity for new products. This opportunity needs to be explored with private sector partners.
16. Prospects for expanding the *Shea* olein market would mean moving from very small and irregular production to substantial tonnages. Whether this happens will depend on private sector decisions. There is an opportunity to supply a competitively priced *Shea* olein product to the expanding cooking-oils market. As a by-product of *Shea* stearin processing for the cosmetics market, *Shea* olein could be sold as a highly competitive product. Sales of crude *Shea* oil on national and possibly regional markets will depend crucially on consumer preferences and how effectively the product can be marketed. There is some conflict between the local preference for the roasted flavor of *Shea* oil and the need to process without roasting the nuts for the extraction of high quality stearin.
17. Surveys in the local cosmetics markets found considerable interest in developing value-added *Shea* cosmetic products for a domestic market of expatriates and upscale Ugandan women. In consumer trials it was found that most respondents had never before heard of *Shea* but all reacted very favorably towards it, especially when told of the moisturizing and healing benefits and the organic/cultural value of the product. Women would be interested in buying lip balm, face and body lotions, hand cream, and soaps. The major challenge that local manufacturers of *Shea* products need to address is the smell. It will be important to create a pleasant smelling product while still retaining the

natural positioning and the product benefits. Quality packaging is also essential and a high profile, well-targeted marketing campaign will be necessary to communicate the emotional and physical product benefits.

18. Prospects for increased sales of improved *Shea* cooking-oil in Northern Uganda were positive but the reality of limited income and the spending habits of the women in Lira suggest some caution. Currently, women buy only small quantities of oil, tending towards the cheaper, multipurpose oils such as sunflower oil (locally produced) or cooking-oil from Mukwano Industries. *Shea* nut oil as a comestible is seen to be a luxury (and a seasonal one at that), and the flavor of *Shea* is not one that people would want in their daily diet.
19. With regard to the international market, the main cosmetics buyers of *Shea* butter/oil are located in Europe and the US. European and US cosmetics companies buy from a variety of sources, depending on requirements. A large proportion of the *Shea* butter used in cosmetics is purchased from the food industry in a highly refined form. Such butter is cheap (having usually been obtained through solvent extraction), readily available, reliable in quality, and does not become rancid. However, the refining process removes most of the sun-protection, healing, and antiseptic qualities of natural butter. Despite this, most of the larger cosmetics companies prefer to use refined butter as this enables the producer to label the product as a "*Shea*" formulation. Smaller companies and specialist suppliers of cosmetics ingredients are willing to buy unrefined *Shea* butter from Africa. However, concerns over quality have forced them to become intimately involved with its production. This aspect reinforces the need for strong linkages between primary and secondary processors in the market chain.
20. The Ugandan cosmetics market is supplied from both international and local companies. Those companies not using *Shea* would be interested to test the product. Those already using *Shea* had plans to expand use up to 1015 t/year.
21. In Uganda, there are a number of private sector companies and agencies that are interested in expanding the Ugandan *Shea* market. For production and processing, these include COVOL, NUSPA, Guru Nanak Oil Mills, and Mukwano Industries; for local cosmetics manufacture, these may include AVIS, Desbro, and UKI Ltd; and for export, COVOL, Guru Nanak Oil Mills, Mukwano Industries, and possibly Technoserve. However, for any progress to be made in the *Shea* sector, more detailed business plans need to be developed so that these agencies can make more informed decisions on levels of investment and marketing partners.
22. Support services required to develop the *Shea* sector in Uganda include extraction testing, development and market testing of new products and linkage between local processors and local and/or international buyers. There are a number of local agencies that could assist in these areas, including NARO, Food Science Research Institute, and IITA, for product development. Market testing of products and packaging could be developed through agencies such as Research International, K2, and other local consultants. Overseas market linkage could be investigated through the IDEA project and other overseas partners, such as the Natural Resources Institute and Tradecraft.

23. In conclusion, *Shea* is a highly valued commodity in northern Uganda, but is virtually unknown outside the production area. In the northern districts, the crop is important to the livelihoods of the people and *Shea* has particularly important dietary, food security, and financial benefits for women. Due to changes in technology and world market demand, *Shea* has the potential for market expansion at the local, national, and international levels. The findings from this study suggest that the most promising area is in cosmetics products for both domestic and international markets. There is evidence that the demand for *Shea* products is increasing: any donor intervention that leads to an increased demand for Ugandan *Shea* would have a significant and positive impact on the livelihoods of the people, in particular of the women, in the *Shea* producing area. However, for this group to be able to capitalize on a more commercial *Shea* sector, additional support is required to link the gatherers and primary processors to profitable niche markets.

Note

This study was commissioned by Associates in Rural Development Inc. (ARD), on behalf of USAID Kampala, to evaluate the economic and environmental prospects for the *Shea* sector of Uganda. Specifically, the study aimed to evaluate the prospects for a range of *Shea* products for the local, national, and international markets. The output from the study is to provide options for improving the livelihoods of communities based in the *Shea* producing areas of Uganda and to suggest possible strategies to assist greater commercialization of this novel traditional product in an environmentally sustainable manner.

Evaluating the marketing opportunities for *Shea* nut and *Shea* nut processed products in Uganda

Background

Vitellaria paradoxa, the *Shea* butter tree, grows across a wide swathe of Africa, from Senegal to Ethiopia. Throughout the “*Shea* belt” the trees are highly valued by the local communities, not only for the economic and dietary value of the cooking-oil, but also for other products. The fruit pulp, bark, roots, and leaves are used in traditional medicines and the wood and charcoal are used for building and cooking (Fig 1).

European explorers made first records of the *Shea* tree in 1728 and Mungo Park sent back the first samples to Europe in 1796. It was some 30 years after Park's expedition to West Africa that von Gaertner in 1807 classified the tree within the family Sapotaceae, as *Vitellaria paradoxa*. In 1865, Theodore Kotschy reclassified the West African tree as *Vitellaria butyrospermum* subsp. *parkii* and, at the same time, the East African subspecies, collected by the Reverend Knoblecher, was classified as *Vitellaria butyrospermum* subsp. *nilotica*. In 1962, Hepper reclassified the plant as *Butyrospermum paradoxum* subsp. *parkii* and *Butyrospermum paradoxum* subsp. *nilotica*. Most recently, Hall and Hindle (1995) reclassified the tree as *Vitellaria paradoxa* subsp. *paradoxa* and *Vitellaria paradoxa* subsp. *nilotica*.

In his journals, Park described the local trade in *Shea* products as a vibrant, inland commercial activity and since that time, colonial agricultural officers have made detailed notes of the local trade in *Shea* nuts, butter, oil, cake, and latex, and speculated on its export trade potential. Along with many other oil crops, samples were tested for fuel and food products. By the 1920s, a flourishing trade was developing between West Africa and Europe where the butter was used in making vegetable margarine and candles.

However, changing agricultural policies in Europe towards greater self-sufficiency and new product formulations led to a decline in demand for *Shea*. In many respects, *Shea* now falls into the “Cinderella” or underutilized crop category. *Shea* continues to be processed and traded in the dry savanna region as a source of cooking-oil but it is no longer a mainstream industrial product. Despite interest by governments and support from FAO expert panels in developing local industries based on *Shea*, no attempts have been made to domesticate the crop. Essentially, *Shea* remains a wild fruit that is seasonally gathered by local communities.

For industrial processors, *Shea* has been relegated to a low cost substitute product but, as with true Cinderella commodities, there is a glimmering interest from the high value niche markets for greater use of *Shea*. Currently, *Shea* is undergoing renewed demand from the

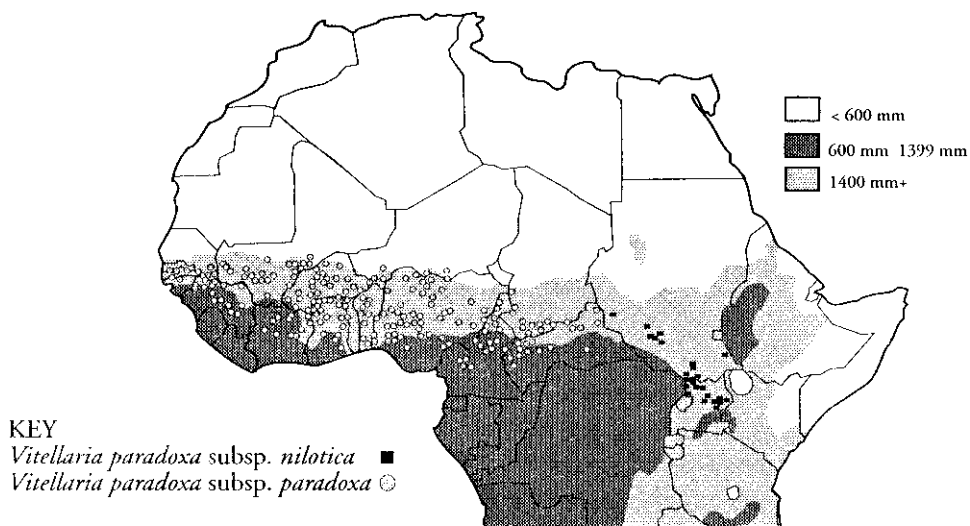


Figure 1. Distribution of *Vitellaria paradoxa* subsp. *paradoxa* and *V. paradoxa* subsp. *nilotica* in relation to mean annual rainfall (from Hall et al. 1998).

high value cosmetics companies. For this market sector, the very facts that *Shea* remains a “wilderness crop”, that it is produced naturally, that it has cultural and medicinal qualities, and is collected and processed by women’s groups in remote rural areas, all combine to create a fashionable scenario for high profile cosmetics marketing.

***Shea* production potential in Africa**

According to Boffa (1999), there are more than 500 million fruiting *Shea* trees across the production belt and FAO estimates that the total *Shea* nut production is approximately 600 000 t/year. This volume translates to more than 1.5 million t/fresh fruit/year, and production is comparable that of other commercial oil crops, such as avocado that currently stands at 2 million t/year. This represents a huge production, given there are no *Shea* plantations and farmers start to protect trees only when they are more than saplings as part of the traditional savanna farming system.

Studies by Ruysen (1957) found that productivity of *V. paradoxa* subsp. *paradoxa* rises rapidly in the age range 40–50 years and stabilizes in trees of 100–200 years before declining in aging plants of 200–400 years. Due to the variable rainfall in the *Shea* belt, fruit production fluctuates considerably from tree to tree and between seasons. Information on productivity is highly variable, with extremes from 5 to 500 kg of fresh fruit/tree/year. However, average fruit yield/tree is conservatively estimated at 15–30 kg/year, (Ruysen 1957) and later, more optimistically, at between 25 and 55 kg/year by Fleury (1981). Schreckenber (1996) calculated an average annual yield of 5 kg/dried kernels/tree in a study in Bénin, which would yield approximately 2 liters of oil/tree.

Using sampling techniques and extrapolating these data over the *Shea* belt, it has been estimated that the total yield of *Shea* nuts is 1 760 000 t, which translates into 432 000 t of *Shea* butter. However, due to the scattered nature of the crop over an extensive and often remote landscape, it is estimated that less than one-third of this amount is collected. From these figures it is projected that from a harvested yield of 545 000 t, (= 131 000 t of *Shea* butter), 105 000 t are used for household and commercial purposes. According to Obi (2000), approximately 65 000 t of nuts (26 000 t butter) are exported for use in food and cosmetics industries.

Global *Shea* markets

The *Shea* market is divided into three distinct categories.

High volume, low value, locally processed products.

High volume, intermediate value exports to the food processing market.

Low volume, high value exports to the cosmetics market.

By far the largest part of the *Shea* production throughout Africa (65%) is not harvested. Of the 35% that are gathered by women and children, 30% are locally processed at an extraction rate of 20% and used to make 100 000 t/year of local butter. Virtually all of this *Shea* butter is used as local cooking-oil. The remaining 5% or less are exported, mostly to the food industry that uses the *Shea* butter as a cocoa butter equivalent (CBE). *Shea* butter is currently trading on the international market at US\$0.50–60/kg (US\$500/t). It is estimated that only 5% of the total volume exported to Europe and North America are used in the cosmetics industry. However, as reported by Collinson and Zewdie-Bosuener (1999), this level is rising.

Demand and marketable attributes of *Shea* high-value products

Recent changes in EU regulations on the use of substitutes for cocoa butter have increased demand for *Shea* from chocolate confectioners as it is now possible to blend up to 5% of CBEs in a chocolate product and still sell it as chocolate. The price of *Shea* in this case is driven by the cost of cocoa butter. In the current climate of commodity prices declining worldwide, this will mean continued depressed prices into the foreseeable future.

However, a recent wave of renewed interest from cosmetics houses, has also rekindled market interest in *Shea*. Whilst this increase in demand represents a small change in global terms, such opportunities can have considerable benefits to the small groups of traders, mostly women, that gather, trade, and process the nuts. For the cosmetics industry, *Shea* has a combination of marketable attributes.

Shea is harvested by women in rural areas, and this suggests that income will accrue to the most vulnerable. As such, this is an incentive to pay premium prices for *Shea* products. This aspect has already been used by the Body Shop in a high profile, community-based project, centered on one village in Ghana.

Shea grows in a “natural” savanna system, lending it “natural organic qualities” currently much in favor with industrial companies. Recent scare stories about industrial agricultural

products have led to a major boom in the organics sector with reports of 30% increases in sales.

Shea is considered to have traditional healing properties and this is a strong basis for building a “natural/medicinal” identity.

Thus, *Shea* is a highly suitable candidate for special interest support through ethical trading, gender support, and “natural” labelling. These marketable qualities are increasingly important market levers. Consequently, if a quality product can be supplied on a regular basis, then the future market options for *Shea* have potential. However, in order to make this work, all the aspects in the marketing chain need to be highly polished. It will require a highly dedicated team with considerable investment and business acumen to enter into the higher value markets.

It should also be noted that the future of *Shea* within the *haute couture* cosmetics market is not without risk. *Shea* was in high demand in the 1970s but fashions changed, and sales of *Shea* butter to the cosmetics industry declined. The recent renewal in interest for *Shea* shows a revival in the market but the rate of market growth and the longevity of this market are uncertain.

Production method

Shea trees begin to bear fruit after 15 years and increase in yield up to their main fruit production period from 100 to 200 years. Fruit production then declines but trees continue to produce fruit even up to 400 years. The long period taken to reach maturity has discouraged plantation planting although *Shea* are used as shade trees for other crops in certain dry areas.

The nuts are embedded in soft fruits that fall to the ground during the harvesting period. In West Africa, the nuts are buried in pits; this causes the pulp to ferment and disintegrate, and sufficient heat is generated to prevent germination that spoils the *Shea* oil. After fermentation, the nuts are dried for a few days and later shelled to reduce moisture content from 40% to about 7%. The oil is extracted locally by a process involving heating and kneading the crushed kernels and straining the resultant crush to release the oil. In Uganda, the nuts are sun dried rather than fermented, then roasted prior to processing. As in West Africa, the nuts are crushed and the mash is heated in hot water to separate the oil. *Shea* butter is produced on a commercial scale in Europe using hydraulic presses on the nuts. The product is bleached with a hexane solvent. The butter is then stored and transported in cool conditions in airtight containers to avoid rancidity.

Consumption

The main industrial consumption (almost all for chocolate production) is in Europe, Japan, and Northern America. In the EU, only the UK, the Irish Republic, and Denmark are permitted to use *Shea* butter in their chocolate products, but other EU countries are lobbying to be allowed to use up to 5% vegetable fats, other than cocoa butter, in their chocolate. According to a recent EU ruling, chocolate made with less than 100% cocoa butter can

be sold under names such as “milk chocolate” to differentiate it from the pure and most expensive original product.

Main market features

The supply of *Shea* butter to the international market is flexible, but demand is not. Only a fraction of the potential production is exported for industrial use. Although *Shea* butter offers certain useful technical characteristics to the chocolate maker, its use in the chocolate industry depends on its price in relation to that of cocoa butter. There are very few major refiners and they have considerable control of the market through a system of long-term purchase agreements. New producers of sizeable quantities are unlikely to find a ready market for their product. It is, therefore, something of a closed market in terms of export.

The main buyers in the international trade are the refiners in developed countries, often associated with the chocolate and/or food industry. They prefer to buy the raw nuts rather than the butter in order to have as much control as possible in the processing and quality of the final product. Another reason for preferring nuts is that they can be stored for up to five years in the right conditions, whereas butter is more expensive to store and deteriorates more rapidly. Any exports of butter from African countries tend to be of unrefined material.

Supply

For the export market, *Shea* nut supply far outstrips demand. The largest percentage of the 600 000 t of *Shea* butter, *V. subsp. paradoxa*, is produced in West Africa. Most is used locally as a cooking-oil or for the skin and hair. The other subspecies, *V. nilotica*, which has a quality preferred by the cosmetics firms, is primarily grown and processed in northern Uganda and southern Sudan. Both of these areas are insecure and so the product is generally unavailable to the international markets. Hence, products from *V. nilotica* have not been commercially developed.

Grades

For the export market, individual buyers specify their own quality conditions for purchase of *Shea* butter. Typically, free fatty acid (FFA) and moisture content should be no higher than 1%. Buyers may also specify a particular iodine value and a melting point between 30 and 40 °C. The product should be free of impurities.

Users in the mainstream cosmetics industry accept only a very highly refined product and may require a detailed specification of the different fatty acids, the refractive index, and saponification value. To achieve consistency for these high-quality standards, the industry has tended to buy nuts from traders and store them at the processing factories.

Against this trend, there are some cosmetics companies who are working with communities in Africa to source *Shea* products including butter, but processing methods are stringent and volumes of supply through in-country processing remain very limited. The most publicized community is the Ghanaian village that is linked with the Body Shop, UK. In this case, the Body Shop is working directly with women's groups to produce a high

quality product that is then further refined and incorporated into the *Shea* product range. These products were widely promoted in the summer season of 2001.

For the local cooking-oil and nut trade, there are no grades and standards, and this leads to a highly variable quality in the oils produced.

Chemical composition of *Shea* nuts across Africa

Chemical analysis of *Shea* butter extracted from samples of nuts from four African countries (Uganda, Nigeria, Burkina Faso, and Mali) were conducted by the Ben Gurion University, Israel, as part of an ongoing, EU-funded research project on *Shea*. Fatty acid analysis shows there is a high level of variability in *Shea* oils across Africa (Table 1). The Ugandan sample had a 59% oleic acid content, compared with 47% for Nigeria and only 39% for Burkina Faso.

The large variability in fatty acid profiles indicates that *Shea* butter is not a single uniform product across the continent. For example, Malian *Shea* more closely resembles cocoa butter while Ugandan *Shea* has more similarities with olive oil, due to its high oleic content. This variability suggests that *Shea* oil from different regions could be targeted towards different niche markets or industrial uses, assuming that the genotypic effect is greater than the environmental effect on quality, which is unknown. If reliable vegetative propagation techniques could be developed, clones of trees bearing specific types of nuts with unique chemical constituents could also be selected and planted to produce a higher value crop. Specific selections may be envisioned for cocoa butter substitution in foods, for production of industrial stearin, for cosmetics products high in vitamins and other antioxidant phenolic compounds, and for oil that could compete with olive oil (Maranz and Wiesman, unpublished).

Table 1. Fatty acid profiles: *Shea* butter compared with competing oils.

Oil type	Lauric	Myristic	Palmitic	Stearic	Oleic	Linoleic	Linolenic
Non- <i>Shea</i>	—	—	—	—	—	—	—
Cocoa butter	—	—	25	35	30–40	2–4	—
Olive	—	—	12	2	72	8	1
Palm oil (husk)	—	—	42	4	38	9	—
Coconut	44	16	8	3	5	2	—
<i>Shea</i> Butter	—	—	—	—	—	—	—
Literature	0–0.5	0–1.6	3–9	30–50	41–50	4–11	0–7.5
Uganda	—	—	6.5	26.4	59.3	6.2	0.2
Nigeria	—	—	3.2	38.9	47.5	6.5	0.2
Burkina Faso	—	—	12.1	42.5	39.3	4.5	0.2
Mali	—	—	19	31.1	42.6	5.7	0.2

Market development in producer countries

West African market development

In West Africa, particularly Ghana and Mali, marketing channels are well-defined and there has been a long-standing export of *Shea* nuts and butter to a number of European countries and North America. The product from the West African *Shea* tree, *Vitellaria paradoxa* subsp. *paradoxa*, is a hard, waxy substance. The hardness at room temperature (normally 21–22 °C) is due to the composition of oils within the nuts, which have a high stearin:olein ratio. Stearin is a solid fat fraction and olein is an oil-like liquid at room temperature. Both fractions, the oil and the fat, are used as raw materials in cooking-oil, margarine, cosmetics, soap, detergents, and candles. See Annex 1.

The major *Shea* producing countries in West Africa are Mali, Burkina Faso, Bénin, Senegal, Côte d'Ivoire, Ghana, Gambia, and Nigeria. Nuts for export are collected from gatherers or are collected on a large scale by local commercial companies, landowners, or cooperatives that have long-term contracts with large, foreign refining companies. Mali, the largest producer, is estimated to produce approximately 150 000 t/nuts/year, (Robbins 1995).

The primary export market for the West African *Shea* butter is as a substitute for cocoa butter in the chocolate and confectionery industry, the *Shea* product being referred to as a CBE. The second, significantly smaller but higher-value, export market is within the cosmetics industry, where small amounts of *Shea* butter are used as a component within skin-moisturizing, sun-screening, and skin healing products. Other manufacturing uses are in the pharmaceutical and edible fat industries. However, these markets are very limited. Currently, *Shea* is also being tested in new products, such as creams for HIV patients to provide relief from skin rashes and irritations, and in animal health products. Both of these would be new and potentially lucrative niche markets for the *Shea* gatherers and markets of this type offer strong price incentives for exploitation.

In Ghana, a subsidiary of a major international company launched a skin-moisturizing product called “Vaseline *Shea* Butter” in 1996. The commercial success of this product was mixed and the manufacturer claims that many of the problems were technical rather than demand-based. According to Collinson and Zewdie-Bosuener (1999), the company was planning to produce 150–200 t of this product, and this would make a significant in-country market demand for *Shea* butter.

A major international manufacturer of cosmetics in Ghana launched two *Shea* products onto the market in 1996. However, these products were withdrawn due to poor sales and quality problems. The company has plans to relaunch these products if it can find a regular supply of high quality *Shea* butter.

Within the industrial sector, Aarhus Olie (DK) is the only large-scale company that manufactures edible fats and oils from *Shea* butter. Until 1997, all processing of *Shea* nuts was conducted in Denmark and formulations were supplied thereafter to confectionery and cosmetics firms. Grades and standards are clearly a major issue and for this reason,

processing companies preferred to buy “standard” industrial products on guaranteed supply contracts from companies such as Aarhus Olie. Reported problems with the quality of supplies from producer countries led to all the value-added part of the processing being conducted overseas (Collinson 1999).

Recently, European environmental legislation has militated against the processing of oil products in-country and this has led to greater demand for processing in the *Shea* producing countries. For these reasons, Aarhus Olie (Ghana branch) had plans to increase purchasing of butter up to 1000 t/year and in 1999, Aarhus Olie was offering fob price of US\$0.80/kg, with a 10% premium for quality butter.

In Ghana, there are 3–4 small to medium-scale oil milling companies that process *Shea* butter. Kassardjians Ltd. is a medium-sized company that produces 2–3 t/*Shea* butter/day during the main season. The process is semimechanized, but all the processing is done using considerable labor and low-tech. systems. More recently, companies with more technical capacity have also contracted with the European buyers. These plants have mechanized presses and deodorizing plants that can process 5–10 t/day of the product.

The Body Shop, a High Street cosmetics company based in the UK, is piloting a scheme to process *Shea* butter at the community level in a collaborative commercial project with a village in northern Ghana. This joint venture was exporting approximately 30 t/year of butter. In the summer, 2001, the Body Shop *Shea* campaign had a high profile in the High Streets of UK towns and this does indicate a revival of interest in using *Shea* and in the idea of community-based processing–market linkage projects.

Eastern African market development

In comparison with West Africa, the commercial development of *Shea* products in Uganda remains at an embryonic stage, with little documentation on the market dynamics of the crop in Uganda and its surrounding countries. Production of *Shea* in Northern Uganda is from *V. paradoxa* subsp. *nilotica*. The crop is mainly processed into cooking-oil in the *Shea* belt and market supplies are typically based on the local purchases by people from the *Shea* region who know the product and have traditionally used it as a cooking-oil, a Vaseline-type product for babies, and for religious ceremonies. Sales of *Shea* products outside the *Shea* belt are minimal, with no statistics available for exports from the region.

The current market sector can be described as almost entirely traditional in nature with low levels of collection and consumption. There are numerous reasons why a parallel industrial supply has not emerged. The major factors include the following.

- There is a significantly lower concentration of *Shea* trees, (an average of 7 trees/ha in East Africa, compared with > 50 trees/ha in West Africa).
- Levels of consumption of the local oil are high in the *Shea* belt of Uganda.
- East African *Shea* butter is significantly softer than the West African *Shea* butter that the users of CBE prefer. At room temperature (21–22 °C) East African *Shea* has a semiliquid consistency whereas West African *Shea* is a hard wax.
- Transportation costs are higher in East Africa than West Africa; Uganda lacks a nearby port to export the product.

- A lack of security within the Ugandan–Sudanese *Shea* belt has reduced investment to a minimum and obviously hampers supply chain support and activities.
- There is a lack of market linkage between local gatherers and users in industrialized nations.

These factors all work against the development of market linkage between suppliers in Eastern African and buyers in Europe and the North America. In order to overcome these problems, highly innovative approaches will be required and new buyers identified if market opportunities are to be developed.

Despite this somewhat discouraging outlook, East African *Shea* has potential value, as its qualities may be highly suited for specific niche markets. According to its advocates, Uganda *Shea* has all the typical attributes of a high value “natural” niche product and the medicinal and skin absorption qualities are “real”. They are real in the sense that whilst few or no stringent tests have been conducted on *Shea* products, there is a sufficient quality of anecdotal evidence that the products do what is claimed.

There is a strong cultural value attributed to *Shea*. It grows naturally but is limited in supply due to its poor accessibility. Therefore, the product has merit in that it can be harvested only through local community-based action. Ugandan *Shea* butter is liquid at room temperature and this consistency is particularly suitable for use in hand creams and lotions. This quality attribute may have considerable commercial value, as the new growth markets in “natural products” require that the original product be used in its unrefined state.

Trends in the global market for “fair trade” agreements also indicate that Western consumers are prepared to pay higher prices for products that are processed in the country of origin, and for a limited niche production system this may be feasible.

The herbal medicinal market has shown dramatic growth and has developed in North America from a US\$10 billion/year industry 5 years ago into US\$40 billion/year sector now. This also provides a major new market where *Shea* is used as an ingredient in the new and expanding range of herbal medicines.

Other unexplored potential markets are value-added products sold into the middle to higher income, African consumer market. In West Africa, the local cosmetics industry is using increasing amounts of *Shea* in its beauty products and this may be a market that has potential in Eastern Africa. Developing products for the local and regional markets also has the advantage that it provides income and may prove to be a useful testing ground for products, prior to sales into export markets.

In spite of the potential suitability of Ugandan *Shea* for these growth markets, such opportunities have not been explored. Thus, Uganda *Shea* products remain low value, low-quality products sold to low income groups in and around the *Shea* production sites.

Given this raft of opportunities, and the range of potentially good qualities of *Shea*, one must ask the question, Why is there no industry? *Shea* is not a new product; it is not difficult to process. Therefore, the most likely answer is that there is no effective demand beyond the local production of oil.

Highly specialized and motivated skills will be required to develop the sector which is based on the processing of the fruit of low density, widely distributed trees in a poor, isolated,

and insecure part of a landlocked country. To supply a highly “quality conscious” niche market product in the high end of the cosmetics market is not a simple task. Therefore, in order to assess the situation regarding investment, one must make a cold economic evaluation of this market opportunity against other market opportunities in northern Uganda.

Rationale for donor support to the Ugandan Shea subsector to date

The investments made by USAID into the *Shea* sector over the past eight years have offered the potential to fulfil two strategic objectives in Uganda.

1. Promote sustainable biodiversity conservation methods.
2. Exploit indigenous crops for economic growth.

The *Shea* sector in Eastern Africa has developed around two projects.

Cooperative Office for Voluntary Organization (COVOL) is a United States-based NGO working on the conservation of *Shea* in Northern Uganda, <http://www.covol.org/>

There is also the European Union-funded (INCO) research project on *Shea* development being implemented by the University of Wales (Bangor).

These projects aimed to provide economic impact in one of the poorest areas of Uganda through working on a nondomesticated crop within the traditional savanna farming systems. In this region, there are limited economic opportunities; investment is low; security is poor due to rebel activities from the Sudan; *Shea* has the added attraction of being a crop that is almost exclusively gathered, processed, and traded by women and children. Impact, in terms of greater market linkage for the crop could, therefore, provide income for the most vulnerable in society and also protect an important natural resource.

The USAID-supported COVOL project focused on seven counties in the districts of Lira, Katakwi, Kitgum, and Kotido. The project had two components: conservation and marketing /processing. It aimed to develop and disseminate technology for “enhancing” the production of *Shea* oil/butter compared with traditional methods. The development hypothesis of the project was that improved quality and market efficiency of *Shea* products would raise income levels among rural households in a historically marginalized region of the country. This would provide incentives for rural producers to conserve the *Shea* tree and the savanna in which it grows and counter its destruction for fuel and charcoal making and losses through agricultural expansion.

The conservation aspect of the work dealt with analyzing the distribution of trees in northern Uganda, and gathered information on tree age and production. *Shea* trees in Lira district were at a density of 7 trees/ha. The trees produce approximately 30 kg/fruit/year, which in turn produces 3–5 kg/nuts. These nuts are traditionally processed into 1.5–3 kg/*Shea* oil/tree (Nkuutu et al. unpublished).

According to Nkuutu et al. (unpublished) *Shea* tree numbers in northern Uganda are declining. Studies of *Shea* tree populations in northern Uganda revealed a population gap of trees aged between 5 and 100 years. *Shea* does not produce fruit for the first 15–20 years. Surveys in Otuoke County, Lira district, indicate that the bulk of productive trees are more than 100 years old. The loss of younger trees has been linked with changing land-use

practices and increased levels of more permanent arable farming. Increased arable pressure has led to a measurable loss of younger fruit bearing trees which is considered to result from slash-and-burn clearing methods. Increased human population pressure has also led to more trees being felled for charcoal burning, despite local bylaws that ban the use of *Shea* for charcoal production. According to local sources, these laws are not well enforced and it is common knowledge that *Shea* wood is good for charcoal and, due to its termite resistance, is ideal for house construction. Consequently, the tree is used for both purposes.

To offset the destruction of the *Shea* trees, the COVOL project led a high-profile campaign against making charcoal from *Shea* and also developed tree nurseries to promote tree planting as a means of increasing tree numbers. The processing and marketing aspect of the project focused on developing improved methods of processing *Shea* butter, using mechanical grinders and screw press technologies. These technologies provide a higher rate of extraction than the local manual techniques and produce a butter of a higher quality. The so-called “cold press” butter is of a quality high enough to be used in cosmetics formulation; this product has been incorporated into a number of cosmetics products that have undergone limited market testing by COVOL in San Francisco, USA.

During the life of the COVOL project, an indigenous production and marketing body—the Northern Uganda *Shea* Producers Association (NUSPA)—was established. NUSPA is an umbrella organization for widely scattered, small, village-based *Shea* processing groups and has over 200 members. NUSPA has limited capacity but desires to play a role in promoting and achieving the dual results of the project, conservation and value-added processing.

Although the markets for *Shea* nuts and traditionally produced *Shea* oil/butter are established in the northern districts, opportunities for establishing a domestic market for both local and value-added products in the form of food oils and cosmetics have not been tested. Similarly, product testing of export formulations has been limited and there is no information about products being tested in Uganda.

Achievements of the COVOL project

The conservation aspect of this project was successful. People interviewed in the *Shea* zone clearly stated that the *Shea* project played an important role in raising the cultural importance of the tree and stimulated a collective notion that the trees should be protected from careless burning and sales for charcoal.

The research aspects of the project were presented at a regional conference, in partnership with the INCO project. This conference debated the various issues related to *Shea* production in Eastern Africa, (Lovett and Masters unpublished). The proceedings of this conference provide an excellent overview of *Shea* production, processing, and market opportunities, and when published, will be a useful information resource.

With regard to the commercialization of *Shea* products in Uganda, the COVOL project also made significant progress in several aspects.

- Developing women's groups for the collection and processing of *Shea* nuts.
- Establishing the NUSPA cooperative.



Figure 2. Range of COVOL Shea products.

- Introducing equipment to process *Shea* nuts into a higher quality product via a cold press process.
- Training women in quality and grading of nuts and in high-quality processing of *Shea* butter.
- Developing a range of products for local and international markets. See Figure 2.
- Developing a partner organization in USA, which plans to act as a conduit for sales of processed *Shea* butter, first-stage processed product.
- Establishing a product brand name “Nilotica” www.covol.org/ see Annex 3.
- Developing an interactive website for the promotion and sales of Uganda *Shea* products.
- Establishing linkage with a major boutique, Body Time, for sales of the product.

Despite substantial progress in the area of product development and local supply chain organization, export market linkage remains weak and sales of *Shea* butter to the USA are currently measured in terms of tens of kilograms. Secondary processing of the butter into high value niche market products is irregular and in small volumes.

The COVOL marketing strategy

The model for sales of the product was based on a community scheme in which women’s groups purchased *Shea* nuts and processed the nuts into butter in their villages. The butter was then sold to COVOL for Ush 110 000/20 kg of cold pressed oil and for Ush 65,000/20 kg of hot pressed oil. (US\$1 = Ush 1750).

The wholesale market price for *Shea* oil is approximately Ush 30 000/20 kg. Hence, there was a very strong price incentive for the women’s groups to store their nuts and process when COVOL required a shipment. Average incomes in this region of the country are less than US\$1.00/day; therefore the prospects of US\$60 batch supplies are probably the most lucrative activity the women are able to access in a year. Loyalty to COVOL was strong in

terms of holding the nuts for a shipment and this commitment indicates the importance of this economic activity for the women.

The COVOL organization purchased the processed oil and then conducted some simple form of fractionation, prior to shipping the butter to their sister agency in USA. In the USA, the butter was processed it into high-value hand and body creams through a partner cosmetics manufacturing company. The product was then retailed at US\$15–35 for 35 ml. At this price, even the high premiums paid by COVOL to the women's group were easily absorbed.

Given this marketing plan, if volumes of the product were to increase, there would be a dramatic economic benefit to the NUSPA women's groups. A detailed economic assessment of the COVOL project was undertaken by the Association pour la promotion et la propagation de patrimoine végétal des régions arides et semi-arides (PROPAGE) in February 1999. This provides a clear breakdown of the exact costs for the products and the conclusion was that the process and model developed by the project were viable.

The acid test, however, is the volume of sales. Whilst the Body Shop approach makes shipments of 30+ t/year, the COVOL project exported only 100 kg/year. The weakest link for this process was the retail sector. COVOL had developed a formulation for their cosmetics but did not have rights to the formulation and, therefore, were obliged to pay a franchise fee. The retail agency was primarily Body Time, but this was only on a test basis and it seems that COVOL was aiming to use e-commerce as the main avenue of sales. It may be that the retail aspect of the COVOL strategy was a major hurdle to success, although there are no figures on sales. An alternative approach would have been for COVOL to supply their high-quality *Shea* as an ingredient to other retailers. This would have avoided the problems of distribution and meant that more time could have been devoted to reducing costs and raising the profile for the qualities of the product.

The natural *Shea* resource in Uganda

Studies conducted on *Shea* across Africa indicate the major differences in the average densities of trees across the *Shea* belt (Table 2). Although *Shea* has been under investigation for commercial exploitation in Uganda since the 1930s, there has been no comprehensive study to determine the potential supply of *Shea* nuts and estimates remain vague. The best information comes from the COVOL–INCO research project which conducted a series of surveys to determine tree density by land use and tree age profiles in selected counties of Lira district. In addition, D. Nkuutu conducted more extensive, though rapid, reconnaissance surveys in the northern districts outside the COVOL project area, to gauge the approximate tree density in the Ugandan *Shea* belt.

For the purposes of this study, a combination of these datasets was used to estimate the potential supply of *Shea* in Uganda. The detailed surveys conducted in Otuke County by Nkuutu et al. showed a mean of 32 trees/ha of various species. The tree population was made up from 72 recorded tree species. Within this agroecozone, the most common tree was *V. paradoxa*, at a density of 7 trees/ha, which accounted for 55% of the total estimated tree biomass. The survey revealed that in the highest density locations, the numbers of *Shea* trees were up to 50 trees/ha. Excluding the wetland areas, the average density of *Shea* was approximately 9 trees/ha (Table 3).

Table 2. Mean numbers of trees maintained on farmed parklands across Africa.

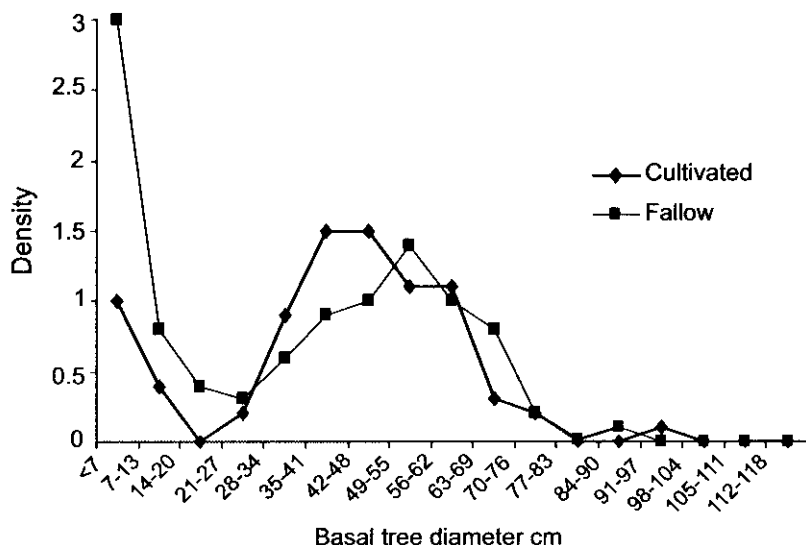
Country	<i>V. paradoxa</i> /ha	All trees /ha	Reference	Rainfall mm/yr
Bénin	24	63	Schreckenberg (1966)	1 300
Burkina Faso	22	27	Boffa (1995)	900
Ghana	21–24	29–61	Lovett and Haq (2000)	1 100
Uganda	7	26	Nkuutu (2000)	1 200

Source: D. Nkuutu et al. (unpublished).

Table 3. Distribution of tree density by land use.

Land use	Mean density <i>V. paradoxa</i> /ha	Mean density other trees/ha
Cultivated	7.0 ± 4.7*	19.3 ± 8.3
Fallow land	7.2 ± 2.8	33.8 ± 17.6
Compound gardens	12.0 ± 12.2	22.4 ± 27.1
Wetlands	0.3 ± 0.4	44.1 ± 12.1
Average density	5.7 ± 2.0	31.6 ± 8.4

Source: D. Nkuutu et al. (unpublished). *Standard deviation.



Source: D. Nkuutu et al. (unpublished).

Figure 3. Density of *V. paradoxa* in fallow and cultivated land uses.

Analysis of the population structure by Lovett et al. showed that the age profile was somewhat skewed with a gap in the size profile for trees in the size class 7–25 cm diameter at the base of the tree (Fig. 3). This finding suggests that the tree has been subject to selective age management, indicated by a high number of trees in the lower and higher age classes. This information supports the view that there has been, in recent years, a systematic removal of trees. This may be the result of trees being used to provide building materials and charcoal and the effects of losses caused by increased agricultural activities, road building, and urban spread.

Estimates of potential Ugandan *Shea* supply

In order to gain a better idea of the potential supply of *Shea* throughout northern Uganda, this study used a combination of techniques and interviews to gain a conservative estimate of the potential crop supply. The initial data were taken from the surveys conducted by D. Nkuutu as part of his BSc thesis. Mr Nkuutu used Arc View to map tree densities. This information was then extrapolated across the *Shea* belt to produce Figures 4–6. Figure 4 shows the general *Shea* belt in Uganda. Figure 5 shows density based on survey work used to establish density zones.

Figure 6 shows a zonal map that was developed by defining the areas based on the density maps. The area of these zones was then calculated via the GIS software and these figures were used to estimate tree density distribution and, therefore, potential yields. Figure 7 shows distances from roads in the *Shea* belt at increments of 5 km. These were used to evaluate distances that people would be able to travel from a road to collect the nuts.

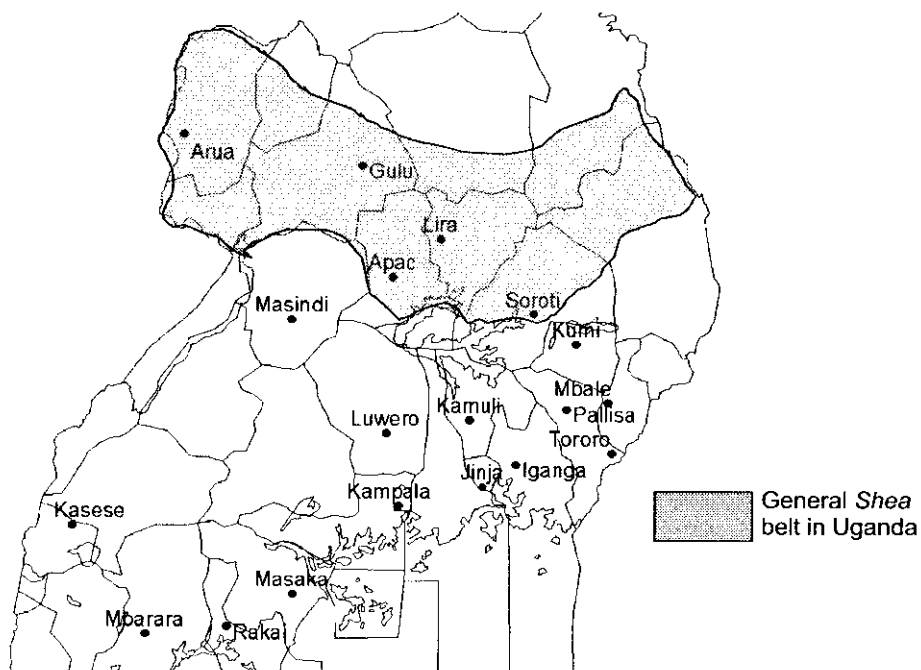


Figure 4. Main *Shea* belt in Uganda.

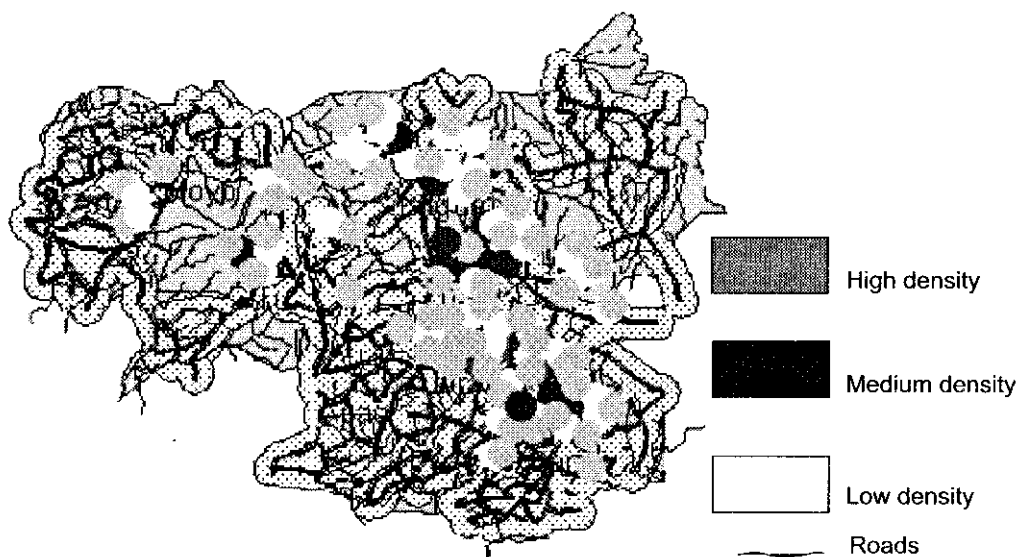


Figure 5. Mapping density zones for *Shea*.

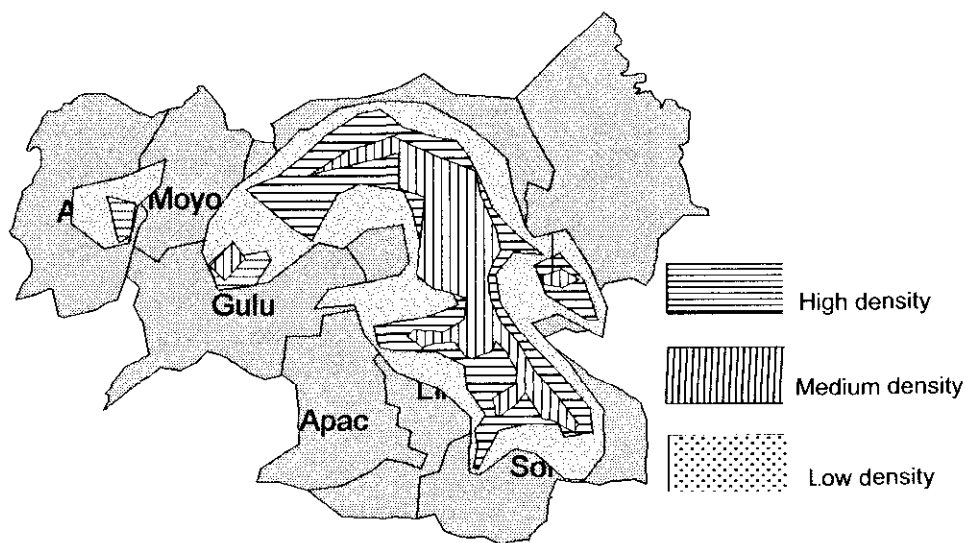


Figure 6. Distribution of *Shea* density zones in northern Uganda.

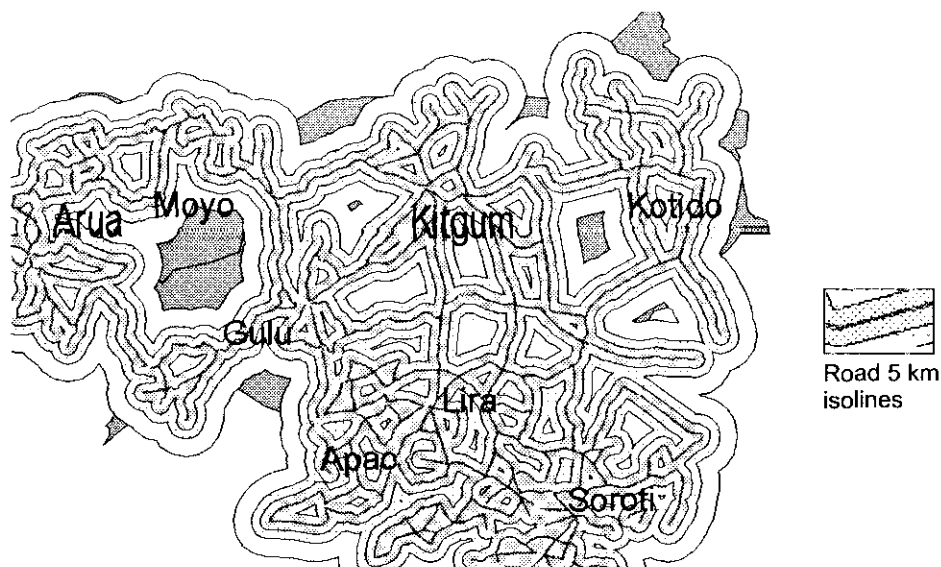


Figure 7. Distance from roads in 5 km isolines in northern Uganda.

It is clear that the entire northern part of the country is fairly well served by roads and there are very few areas that are more than 5 km away from road. The data generated through the GIS software were subjected to a series of assumptions on yield as shown in Tables 4–7

Table 4. *Shea* density of trees according to zones on map by area (km and ha).

	Area (km ²)	Area (ha)
Zone 1.	6,445	644,515
Zone 2.	8,727	872,674
Zone 3.	14,554	1,455,449
Total	29,726	2,972,638

Table 5. Tree density based on high and low density ranges.

Low density No. of trees/ ha	High density No. of trees/ ha	No. of trees in zones at low density	No. of trees in zones at high density
11	15	7,089,665	9,667,725
6	10	5,236,044	8,726,740
1	5	1,455,449	7,277,245
	Total	13,781,158	25,671,710

Table 6. Estimate of nut production in northern Uganda based on tree density.

Tree estimates	Low yield (t)	High yield (t)
Low	68,906	206,717
High	128,359	385,076

Table 7. Potential oil supplies from estimated production based on an extraction rate of 20% using traditional techniques.

Tree estimates	Oil yield (liters)	Oil yield (liters)	Value US\$	Value US\$
Low density	15,159,274	45,477,821	12,993,663	38,980,990
High density	28,238,881	84,716,643	24,204,755	72,614,265

to extrapolate density, yield, and potential supply in Uganda. The data in Table 4 were developed from the GIS zones that were generated from density maps. The data in Table 4 were then multiplied by the assumed density ranges that were based on previous fieldwork to provide ranges for numbers of trees within the zones (Table 5).

The low (13,781,158) and high (25,671,710) tree scores from Table 5 were then multiplied by the estimated high and low yield ranges. Figures for low yield (5 kg/kernels/tree) and high yield (15 kg/tree) were converted to tonnes (Table 6).

Estimated kernel tonnage ranges were then converted into liters of oil and cash value in US\$ according to the traditional oil extraction rate (20%, Table 7) and using improved techniques (30%, Table 8).

Table 8. Potential oil supplies from estimated production based on an extraction rate of 30% using improved techniques.

Tree estimates	Oil yield liters	Oil yield liters	Value US\$	Value US\$
Low density	22,738,911	68,216,732	19,490,495	58,471,485
High density	42,358,322	127,074,965	36,307,133	108,921,398

These assumptions provide an estimate that levels of *Shea* nut production in the Ugandan *Shea* belt range from approximately 70 000 to 385 000 t/yr. This would yield between 15 and 80 million liters of oil using traditional methods at a value of US\$30 million, increasing to more than 120 million liters with improved extraction techniques.

The role of *Shea* nuts in the Uganda household economy

Shea nuts in Uganda

Shea oil is considered to be particularly important for household food and income security in the districts of Lira, Katakwi, Kitgum, and Kotido. The crop is a particularly important source of income for rural women and children. Studies by Lovett found a number of categories for utilization of *Shea* (Table 9).

Traditional processing techniques

Processing *Shea* nut into oil is an historical traditional occupation for communities in Northern Uganda. This knowledge has been passed down from generation to generation and is widely practiced in the *Shea* belt. The process is, however, time consuming, labor-intensive, and hard work. Our surveys revealed that many younger women are unwilling to process *Shea* and those in towns particularly prefer to use refined oil or buy *Shea*.

In Uganda, the *Shea* fruits typically mature in June. Women and children harvest the *Shea* fruits when they fall from the trees. At harvest, the fruit is eaten raw and then the kernels are cracked using a stone to obtain the nuts. The nuts are sun dried for about one week. Drying the nuts requires some care and usually nuts are dried for only 2–3 hours/day. Slow drying prevents oil losses. If nuts are overdried or overheated, they become black and either cannot be sold to processors or the quality of the oil is reduced. Heating the nuts also prevents the nuts from germination. Germination reduces quality and is associated with a bitter taste in the processed oil.

Processing *Shea* oil is a labor-intensive process, requiring 4–6 women to work a full day to produce 4–5 liters of oil from 20 liters of nuts. A 20-liter jerry can contains 20 kg of nuts. There are many variations of the main procedures, but essentially, the nuts are ground or pounded into rough grist using mortars and grinding stones and then roasted. Sometimes, the nuts are roasted prior to grinding. After heating, the nuts are ground into a paste. This paste is mixed with an equal amount of water and boiled. The oil is then skimmed off and held in a separate container.

The oil is generally washed again and boiled to remove particles and mucilage from the first stage boiling. The oil is then left to cool. Typically in Uganda, the product is brown oil that separates into the olein and stearin fractions. This quantity can last a family 1–3 weeks depending on usage. Shelf life of the oil is from 1 to 3 weeks, depending on the moisture content after processing.

Table 9. Utilization of the *Shea* tree.

Part of tree (vernacular)	Recorded use
Fruit (<i>korn yao</i>)	Eaten fresh or dried and stored for later use. Also described as a famine food.
Seeds (<i>nyigi yao</i>)	Dried seeds used for oil production or sold for immediate income.
Oil (<i>Moo yao</i>)	Oil is mainly used as edible oil, for frying, as an addition to sauces or sold in local markets as an important source of income. Other uses include utilization in many cultural ceremonies (weddings, birth, naming of babies, funerals, rain, crop/soil fertility, divining the future, and the ordination of local chiefs or priests). The oil has also been described as a traditional moisturizer, as an ointment for newborn babies, as a lubricant of machinery, and as an important component of medicines for sprains, scabies or as a dressing on an open wound. The oil/fat can also be used to produce traditional soap and to protect wood or metal from corrosion.
Wood (<i>dur yao</i>)	Wood is used as charcoal or firewood and the poles are frequently employed as the roof or "Y" shaped poles in house construction. The timber is also used for local handicrafts (stools, pestles, and mortars) and to make beehives. In addition, large tree boles are used to build local canoes.
Whole tree (<i>Yao</i>)	Whole tree is said to improve soil fertility, provide shade, and protect against wind or soil erosion.
Leaves (<i>Pot yao</i>)	Although rarely utilized, the leaves from this tree species are used in funeral ceremonies.
Flowers (<i>tur yao</i>)	The flowers are used to flavor tobacco, as a medicine to reduce chest pains and to cure eye problems. They are important in honey production.
Bark (<i>pok yao</i>)	Frequently used as a medicine for stomach problems, specifically against diarrhoea.
Residue (<i>cet yao</i>)	The residue from oil production is commonly used as a termatocide for houses (to protect walls and poles) or crops, burnt to repel mosquitoes and the ashes from this product can be used to produce local salt.
Latex (<i>odox yao</i>)	The latex is used as a medicine to dress open wounds, as glue to seal pots or calabashes and as an adhesive to trap animals or birds.
Roots (<i>lwit yao</i>)	The roots are utilized in the production of unspecified medicines (should not be confused with mistletoe which is known as <i>lwit yao</i>).

Source: Lovett (2000).

Gender

Shea fruits and nuts are gathered, processed, and retailed exclusively by women and children. *Shea* is an important source of income for women and this income is used to educate children or pay for medication. Children earn an income through gathering *Shea* nuts and selling the kernels at the market. In interviews with oil traders, we were told that children use the funds made through sales of *Shea* to buy their clothes. The money made through *Shea* sales is also used for joint family purchases.

Men are involved in wholesaling the nuts as they have sufficient capital to purchase bulk loads of the commodity and rent stores in the local markets in the main towns and then either retail or wholesale the nuts back to the village markets.

Importance to household diet, income, and food security

Shea nut products command an important position in the diet of the rural community. The children and women eat the fruit while it is raw and the processed crude oil is used as a food accompaniment. In most northern villages, refined cooking-oil is not available. *Shea* oil is the only source of cooking-oil used for all the traditional foods.

Shea oil provides a major source of income to the households engaged in its trade. Interviews in the villages and rural markets revealed that women processors rated *Shea* oil as the highest source of income generation. According to them, *Shea* oil provides more income than brewing and farming. The money made through *Shea* is also clearly for the women, whereas much of a woman's labor goes into agricultural work and most products are then sold by the head of the family, in which case the money is usually the property of the man. Wholesalers stated that trading in *Shea* is highly lucrative, with higher gains on *Shea* than from other crops such as sunflower, groundnut, and maize.

Shea fruit and oil provide an essential part of the diets for the people in the *Shea* belt. Trading in *Shea* also provides an important source of income that is used by the rural households to purchase food.

Comparison with *Shea* nut and butter industries and markets in West Africa

The experience in West Africa

Shea is an important household resource in savanna regions of Côte d'Ivoire, Ghana, Burkina Faso, Mali, Togo, Bénin, and Nigeria. Nut gathering practices and traditional processing techniques are broadly similar across the region. Most *Shea* butter uses are commonly shared and include cooking-oil/fat, food accompaniments, and topical treatments of various skin conditions. The importance of *Shea* butter comes from its relative abundance in areas that are otherwise resource-poor. Its contribution to household welfare and food security is therefore significant.

International trade

In West Africa, the international *Shea* trade is dominated by purchases made by, or on behalf of CBE manufacturers in Europe and Japan. CBEs are a group of highly processed food products made from several different (mostly tropical) vegetable fats. They mimic the properties of cocoa butter with which they are mixed in chocolate and confectionery manufacturing to modify the properties and reduce the cost of the finished product. The CBE trade jealously guards its secrets, even to the point of refusing to release information on the quantity of *Shea* nuts that it purchases. However, African export and European import data suggest that the annual quantities vary between 50 000 and 70 000 t/nuts/year (Jaeger 1999).

Until recently, all the European CBE manufacturers insisted on purchasing *Shea* nuts rather than *Shea* butter from Africa. Only this way, they have claimed, could they control quality (in particular, the content of free fatty acids that cause rancidity). Ultimately, however, this has merely been an excuse to avoid engaging with oil seed millers in West Africa. There now appears to be a concerted effort on the part of some CBE manufacturers (notably the Dutch Unilever subsidiary Lodders Croklaan and the Japanese company Fuji Oils, through its buyer Itochu Ltd.) to buy *Shea* butter from West Africa. To a large extent, this has been prompted by tighter European and Japanese environmental legislation that discriminates against dirty industries, such as oil seed crushing. As a result, European oil seed crushing companies are not reinvesting in plant (pers. comm. Ian Cullen, retired Itochu oils and fats buyer).

There are now plans to export large quantities of *Shea* butter from Ghana. Buyers favor Ghana for several reasons.

- Ghana has a well-earned reputation for producing good quality nuts, with low free fatty acid contents. This is a reflection of good post-gathering practices¹.
- Since 1991, the Ghanaian *Shea* subsector has had minimum interference from the government². This contrasts with the situation in the francophone countries, where government investment and control have been the norm (Devey 1995).
- Ghana is politically stable.

Until early in 2001, the only significant Ghanaian *Shea* butter exporter had been Kassardjian Ltd. Alongside its regular European *Shea* nut buyers, this family-owned company has formed an exclusive *Shea* butter trading relationship with Itochu Ltd, the oils and fats buying company for the Japanese CBE manufacturer Fuji Oils. Kassardjian has adapted the traditional boiling extraction process to produce butter of a consistently high quality. Part of the secret of Kassardjian's success lies in its long-standing and strong position in Ghana's *Shea* nut export industry. The company has a well-developed buying network, which procures high quality *Shea* nuts. This experience has meant that the nuts used for butter extraction have been very low in free fatty acids.

In 2001, Shebu Ltd emerged as a serious *Shea* butter extractor. Backed by Loders Croklaan, the new company plans to extract large quantities of *Shea* butter using expeller presses. The raw material will come from Loders' long-standing *Shea* nut suppliers (Kassardjian and Olam) plus a network of community groups. Loders intend that this latter source will ensure greater returns to poor village people.

Industrial extraction in francophone West Africa has been directed towards local and international cosmetics and toiletry markets. This reflects the predominant French interest in *Shea* butter. As with many other industries in francophone Africa, state involvement in the *Shea* extraction industry has been sizeable.

Historically, French companies have dominated exports of *Shea* nut and butter to the international cosmetics markets. Recently, however, cosmetics buyers from the US and UK have shown an interest in buying directly from African suppliers.

Cosmetics buyers, whether from the USA or Europe, are willing to pay considerably more for *Shea* butter than those buying for the CBE industry. However, on the most conservative estimate, the demand for CBE is at least 17 times larger than the demand for the cosmetics industry. A factor of 70 may be more accurate. There is a tendency for potential *Shea* butter extractors in West Africa to get carried away by the prices that overseas cosmetics buyers offer, while ignoring the small quantities required.

In 1998, the subsidiary of a major international company in Ghana started producing a *Shea* butter-based skin moisturizing product, (Vaseline substitute), designed for the Ghanaian market. Although the product was well received by consumers, difficulties in procuring *Shea*

¹Recent improvements in Burkina Faso prompted by the activities of the Canadian NGO Centre Canadien d'Etudes et de Coopération Internationale (CECI) have put Burkinabé nuts on a par (pers. comm. Jaap Biersteker, Loders Croklaan).

²The Ghanaian *Shea* industry used to be controlled by the Cocoa Board (Chalfin 1996). Clearly, cocoa producers and exporters had a vested interest in controlling exports of a commodity that potentially reduces the quantity of cocoa butter consumed in the world. However, market liberalization forced an end to this arrangement. The idea of control is debatable; one may sensibly piggyback similar commodities within one marketing board.

butter caused the company to withdraw the product. If these problems could have been solved, demand for *Shea* butter would have grown substantially, particularly if the regional market could have been exploited.

Small and medium enterprise *Shea* butter extraction in Ghana

In 2000, DFID funded the Natural Resources Institute (NRI) to conduct a pilot project to test the feasibility of operating a small or medium enterprise (SME) to supply approximately 50 t/year of *Shea* butter to the CBE industry (Gallat et al. 2000). The technology was the same as that used by COVOL and NUSPA in northern Uganda. Unfortunately, the enterprise would have made a substantial loss, even if *Shea* butter prices offered by CBE manufacturers had been substantially greater than those that prevailed at the time. The only practical way for the project to become profitable would have been to reinvest in a much larger capacity plant, thereby putting the opportunity beyond the reach of most local businessmen. However, if production had been oriented to the cosmetics market, and a buyer willing to take 50 t/year of *Shea* butter could have been found, the enterprise would have made substantial profits.

The interaction between industrial and traditional *Shea* activities

In general, industrial and traditional *Shea* activities in Ghana have coexisted happily. Although the volume of exports is much smaller than local consumption, export buying sets the price for *Shea* nuts on the domestic market. Both sources of demand use the same network of traders and there is a danger that increased international demand for *Shea* would raise prices to the exclusion of traditional users (who, all things being equal, should benefit from higher export prices).

If excessive demands were to occur on *Shea* nut resources in Ghana, it would probably not be widespread. Large, sparsely populated areas in the north are currently beyond the economic reach of *Shea* nut buyers (pers. comm. Mr Kassardjian Senior). A substantial increase in international demand would initially be met by extracting more *Shea* nuts from existing supplying areas. Beyond that, traders would be encouraged to enter new areas.

***Shea* product market reviews**

Traditional *Shea* nut market

Shea nuts traded through the local wholesale and retail markets are used in the traditional processing of crude *Shea* oil. Most of this oil is consumed directly in the home, while the remainder are traded in local retail markets mostly by the women who process the oil. Trade is restricted to northern Uganda. We found no evidence that *Shea* nuts were traded outside the northern districts. *Shea* nut wholesalers tend to operate from the larger towns but their buying activities take them to rural *Shea* producing areas where they maintain satellite stores.

Volumes traded

COVOL members of staff were interviewed to establish parameters to determine the volumes of *Shea* traded.

- The zoning of the *Shea* nut belt.
- A list of markets where *Shea* nuts are sold (within the *Shea* belt).
- The seasonal changes in the quantities of nuts sold.
- The quantities of nuts that get to the markets.

The *Shea* nut belt comprises the following districts; Kotido, Katakwi, Kitgum, Gulu, Pader, Lira, Nebbi, and Arua. In six of these districts, 59 markets were identified through discussions with the COVOL team and these markets were confirmed in a later interview with the local trade officer. As we were unable to access market information collected by COVOL, the team members provided information that was based on their best estimates of nuts regularly available in these markets. Results are summarized in Table 10.

From interviews and market visits we estimate that the total quantity of *Shea* nuts traded through the northern Ugandan markets is approximately 6000 t/year. This is 10% of the lowest estimated potential nut yield. The study showed that these nuts are traded between the same groups and, therefore, we assumed a real trade in sellers and users to be 3000–4000 t/yr. This equates to approximately 700 t or 0.8 million liters of oil. Given that the wholesale value of *Shea* oil is approximately Ush 1500/liter, this translates to a market value of Ush 1.2 billion, equivalent to US\$700 000 (US\$1 = Ush 1750).

Market share of *Shea* compared with refined oils

The overall oil market in Uganda is estimated at 44 000 t/yr with a value of about US\$36 million. According to the latest figures from UOSPA, the supply of raw materials including cotton and sunflower seed was 78 000 t in 1999 (Otimodoch and Singh 2000). This converts to approximately 18 750 t of oil. Given a wholesale price for refined oil at Ush 1300/liter, the value of oil from local seed is approximately US\$15 million/year.

Table 10. Quantities of *Shea* nuts traded in six districts of northern Uganda.

District	Quantity of nuts traded in the markets/week (kg)	Quantity of nuts traded in the markets/month (kg)
Peak season		
(June, July, Aug.)		
Lira	29,421	117,686
Pader	108,178	432,712
Gulu	12,558	50,232
Kotido	7,176	28,704
Kitgum	33,368	133,473
Katakwi	29,959	119,839
Off-peak season		
(Sep, Oct, Nov, Dec, Apr, May)		
	Total quantity of nuts traded in June July, and Aug = 2,647,944	
Lira	14,710	58,843
Pader	54,089	216,356
Gulu	6,279	25,116
Kotido	3,588	14,352
Kitgum	16,684	66,736
Katakwi	15428	61,713
Season of scarcity		
(Jan, Feb, Mar)		
	Total quantity of nuts traded in Sep, Oct, Nov, Dec, Apr, and May = 265,8708	
Lira	7,355	29,421
Pader	27,044	108,178
Gulu	3,139	12,558
Kotido	1,794	7,176
Kitgum	8,342	33,368
Katakwi	7,714	30,856
Total quantity of nuts traded in Jan, Feb, and Mar		664,677
Total quantity of nuts traded in markets of the 6 districts/ year (kg)		5,971,329

Survey data, 2001. NB: Gulu and Kotido show lowest quantities; this is mainly due to insecurity.

These figures suggest the market share of traditional *Shea* oil is approaching 5% of the local production. This figure includes only the potential *Shea* oil produced from the traded nuts and does not include the amount of *Shea* oil sold in the market. We also noted that in many of the *Shea* markets, there was no refined oil on sale. Prices of *Shea* oil were higher than prices of refined vegetable oils in the main Lira market; oil traders confirmed there was strong demand for *Shea* oil and that people were prepared to pay more. Therefore, demand for the local product is strong and, despite the often variable quality, *Shea* is competing effectively in the marketplace.

Future sales of *Shea* oil are, however, unclear. Given the higher price of the product and the increasing competition between refined vegetable oil producers, it is likely that in the main towns of the north, refined oil prices will fall relative to *Shea*, as production increases.

It is also likely that, due to the standard quality of the refined oil, consumers will shift to a lower cost substitute.

Seasonality, prices, and quality

The quantity of nuts available in the markets is dependent on the seasonality of the *Shea* tree and the sales of the nuts from the stores. Volumes of nuts at the markets are highest in June, July, and August (peak season). In October, September, November, and December, volumes fall by 50%. The quantities are lowest in January, February, and March, then begin to rise in April and May. During the peak season (June, July, and August), the price of nuts is Ush 200/kg at rural market retail. During the “off peak” season in September, October, November, December, April, and May, the price rises to Ush 300/kg. In the season of scarcity, it may rise to Ush 400 or 500/kg.

The nuts vary in quality though no grading is done at the market. For every given quantity of nuts available in the market, we observed that 50% of the nuts were highest quality, 35% were moderate, and 15% poor quality. COVOL had introduced a campaign to improve nut quality and although the system is not generally used in the trade at the market, many traders were aware of the standards introduced by COVOL.

Constraints

- Lack of commercial markets in which to trade the commodity; trading of *Shea* nuts and oil is mainly restricted to remote rural markets where the nut gatherers are price-takers.
- Demand for the *Shea* nuts is generally low and static and most nuts are sold at the time of gathering for subsistence or household consumption.
- There is a general lack of awareness of the higher-value market opportunities for the commodity and no linkage of the farmers to new markets.

Traders buy *Shea* nuts from villagers in the *Shea* season (June, July, and August). They store them for up to 6 months, sell some to townfolk and the majority back to villagers when the price has risen sufficiently to cover carry costs and provide a healthy profit (usually in the period January–March). Consequently, a large proportion of our upper estimate of 6500 t/yr consists of nuts purchased in one season and sold in another. The estimate, therefore, relates to the volume of transactions rather than the physical quantity of nuts made available for trade. The lower estimate relates to nuts that are traded only in the *Shea* season and is offered as a conservative estimate of the physical quantity of nuts on the market.

Interseasonal storage

Large urban traders and, to a lesser extent, smaller rural traders provide wholesaling and interseasonal storage services. Our fieldwork suggested that urban wholesalers are outnumbered many times by their rural counterparts. Storage also occurs in the home, but apparently quantities are insufficient to satisfy the regular need to process *Shea* nuts into oil throughout the year.

Approximately 50% of gathered nuts are top quality, another 35 to 40% are of second quality, while the remaining 10 to 15% are generally too inferior to process (pers. comm. NUSPA representative).

Trading chain

Figure 8 illustrates the trading chain for *Shea* nuts. Margins and costs along the chain have also been calculated (Table 11). Marketing agents along the chain take on added responsibilities. Rural assemblers were found to involve themselves in transportation in addition to assembly. As can be seen from Figure 8, the distribution channel exhibits variations mainly due to seasonality.

The nuts are collected, dried, and stored at household level by the gatherers, the first point in the trading chain. These have three outlet channels: itinerant traders, rural assemblers, and processors. According to field interviews, both the itinerant traders and the processors constitute a large flow of the volume traded. During the peak season, processors buy directly from the nut gatherers on market days. They also purchase nuts from their households at other times. The gatherers themselves are the major source of nuts for the processors in the peak period.

The volume that goes to the processors is consumed; that going through the itinerant traders during the peak season mostly ends up stored by the assemblers and wholesalers to profit from scarcity during the lean periods.

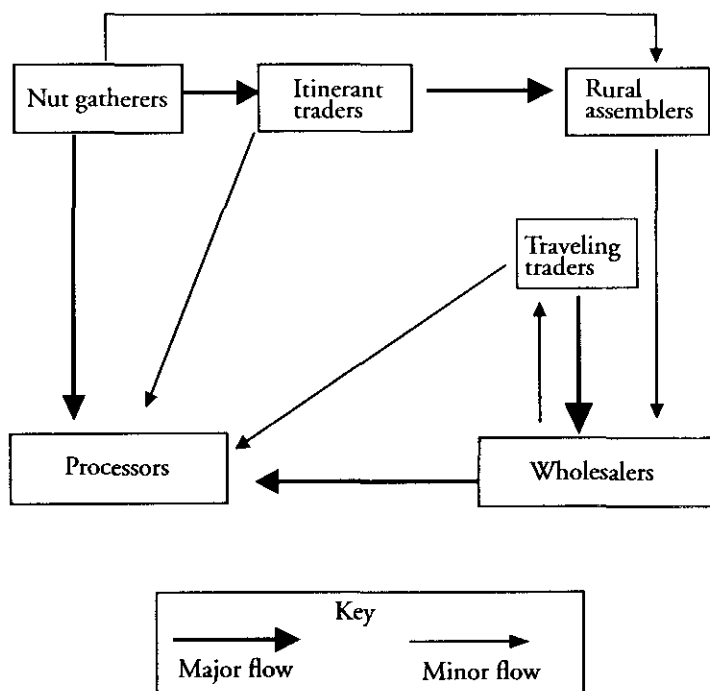


Figure 8. Trading chain for *Shea* nuts in northern Uganda.

Table 11. Shea nut trading costs and margins.

	Ush/100 kg	% of selling price
Gatherer		
Selling price	8,000	
Itinerant trader		
Purchase price	8,000	
Selling price	9,000	
Gross margin	1,000	11
Village assembler		
Purchasing price	9,000	
Selling price	12,500	
Gross margin	3,500	28
Traveling trader		
Purchasing price	12,500	
Selling price	20,000	
Gross margin	7,500	38
Costs		
Loading fee	200	
Local development tax	500	
Transport	2,000	
Unloading fee	200	
Local development tax	1,000	
Total variable cost	3,900	
Net margin	3,600	18
Wholesaler		
Purchase price	20,000	
Selling price	25,000	
Gross margin	5,000	20
Costs		
Miscellaneous labor	300	
Overheads	400	
Total costs	700	
Net margin	4,300	17

Processors purchase the nuts from traveling traders and wholesalers in the lean periods, with the latter constituting the larger flow of trade volumes.

Table 11 gives an example of costs and margins in the trading of *Shea* nuts between the rural and urban areas. It summarizes a chain that begins with the gatherer selling the nuts to the rural assembler usually through the itinerant trader. The itinerant trader relies on his bicycle to traverse the countryside in search of the nuts. After the village assembler comes the traveling trader who arranges for the transportation of the nuts to the urban wholesalers/retailers in town. The wholesaler stores and sells the nuts to the processor.

The cost and price information used to construct Table 11 is the result of fieldwork conducted in July and later in September. The table gives a snapshot of the flow of trade and estimated margins along the chain.

Prices

Shea nut prices vary considerably over the year. During the *Shea* season (June, July, and August 2001) the ex-store price in Lira is approximately Ush 280/kg (US\$0.16/kg). By January, the wholesale price will probably have increased to Ush 495/kg³ (US\$0.29/kg) (Pers. comm. Lira wholesale trader).

Spatial differences do occur. In the main concentration areas of Kitgum, Pader, and Gulu, prices are lower than in Lira and the peripheral areas around the main *Shea* belt. This is mainly attributed to the forces of demand and supply prevailing in such areas. Local traders are of the opinion that prices in the more remote areas of Pader, Kitgum, and Gulu where nut concentration seems to be heavier are much lower than in the other areas. While nuts cost about Ush 50/kg in the more isolated areas of Kitgum, they cost about Ush 80/kg in Lira during the peak season.

Market integration

Prices across the *Shea* belt appear to be remarkably similar, and those that differ, tend to reflect higher transport costs (Masters 1992). This indicates fairly free transmission of market information and a well-integrated market.

Wholesaling profitability

Table 12 gives an estimate of the costs, revenues, and profits of a *Shea* nut wholesaler interviewed during our fieldwork (workings and assumptions appear in the annexes). The wholesaler operates from a store in Lira but has four rural stores in strategic buying locations. Apart from *Shea* nuts, the wholesaler trades and stores beans, soybean, sorghum, millet, and rice.

With a gross margin⁴ of 37%, this is clearly a profitable business. However, there are reportedly only ten traders in Lira and whilst profits are high, volumes are fairly low. In the main market in Lira town there are six nut traders. These buy in bulk usually in bags and

³Sale price has been adjusted to account for a 10% weight loss from drying during the storage period.

⁴Gross margin % is calculated as $100 \times (\text{Revenue} - \text{Total variable operating costs}) / \text{Revenue}$.

their buying price is quoted in kg. They sell nuts in cups to processors in and around Lira town. Just outside the main market, in what is known as the “produce line”, there is one nut trader while another two operate further away from the main market. Greater participation in this trade is probably constrained by a lack of working capital and expertise in *Shea* nut storage. *Shea* nut wholesalers admit that competition is not as great as in other wholesale food markets. Large seasonal price movements and the relatively high levels of profits earned from interseasonal storage suggest that the *Shea* nut wholesale market is uncompetitive. One trader informed us that the main traders are those people who know the crop and know how to manage the product in store. For most people, *Shea* is considered not to be a major commercial commodity.

Expansion of interseasonal trading—opportunities and constraints

Expansions of interseasonal storage would help to reduce the large seasonal price movements. It would also create a greater demand for nuts in the *Shea* season, increase household income during this period, and help to reduce household expenditure later in the year when *Shea* nuts have to be purchased. The overall effect would be an improvement in household food security. Current players in the market do not have sufficient working capital to do this at present.

Table 12. Lira *Shea* nut wholesaler—analysis of profitability.

Operating costs—variable	Per year (Ush)	Per year (US\$)
Purchase price	2,760,000	1,577
Village development tax	50,000	29
Bag	50,000	29
Loading fee	20,000	11
Transport	200,000	114
Unloading fee	20,000	11
Subtotal variable operating costs	3,100,000	1,771
Operating costs—fixed		
Lira attributable store rent*	60,000	34
Attributable rent for four village stores*	42,000	24
Management	525,000	300
Labor	140,000	80
Subtotal fixed operating costs	767,000	438
Subtotal operating costs	3,867,000	2,210
Capital costs	193,350	110
	4,060,350	2,320
Total costs	4,950,000	2,829
Profit (loss)	889,650	508

**Shea* is only one of several commodities stored.

Apart from concerns about liquidity and limited *Shea* storage expertise in the wholesale food trade, expansion might be constrained by a lack of unexploited *Shea* nut reserves. Industrial users of *Shea* nuts who would require a major share of the *Shea* resource would compound this problem. Although our rough estimates indicate that there are sufficient unexploited volumes available, the fragility of household economies in northern Uganda underlines the need for conducting a careful survey of nut resources and current demand in northern Uganda.

Alternatively, we may speculate that an industrialist who would buy up a significant share of the *Shea* nut would also create increased demand for cheaper refined vegetable oil. If this were to occur, a secondary market could be exploited.

Expansion: implications for traditional *Shea* oil processing

Expansion of the interseasonal *Shea* nut trade would support traditional *Shea* oil processing by limiting the price of *Shea* nuts in the lean season.

Implications for the environment

Greater income earned from *Shea* nut gathering would persuade villagers to give greater protection to *Shea* trees. However, overharvesting of *Shea* nut would limit natural regeneration of the *Shea* tree species unless this were tied to or supported by a planting scheme.

Traditional crude *Shea* oil market: quantity, quality, and substitutes

There was insufficient time to collect information on the quantity of *Shea* oil consumed by the population in the north of Uganda. This would require an in-depth study at the household level.

High quality is associated with a dark brown color, the best indication that nuts have been correctly roasted before oil extraction. Such oil is more flavorsome and has a much longer shelf life. Lighter colored oils have been known to become rancid within two weeks, whereas dark brown oil can last for several months. Given this rapid market appraisal, consumers are generally unwilling to pay more for higher quality oil. However, traders know that they can sell darker oil much more quickly than the inferior lighter colored oil. Quality, therefore, does have a market value.

Due to its varied uses, crude *Shea* oil has no direct substitutes. Clearly, however, for some specific uses, substitutes do exist. For frying, the main alternatives are palm and sunflower cooking-oils. As a skin moisturizer and protectant, petroleum jelly is a competitor although it does not have the same healing properties as *Shea*. These are reportedly linked to *Shea* oil's vitamin content.

Competitiveness

In northern markets, crude *Shea* oil is currently more expensive than refined vegetable oils. A bottle (135 ml) costs Ush 300 while a similar quantity of the improved sunflower oil retails for Ush 250. A Fanta bottle (300 ml) of crude *Shea* nut retails at Ush 600 while its sunflower equivalent costs Ush 500.

Information about price movements, however, suggests that in areas deep into the *Shea* belt, sunflower oil is more expensive during the *Shea* peak period. The improved oil is transported into these areas from the major urban centers.

During the *Shea* lean period, crude *Shea* oil prices across the region increase dramatically in the major urban centers. While the price of a 300 ml bottle of vegetable oil is fairly stable at Ush 500 in Lira town throughout most of the year, *Shea* oil increases to Ush 800 in the lean period.

Processing techniques and profitability

Traditional

At harvest, the fruit is eaten and the nuts are sun dried. The processing of oil extraction begins by mixing the nuts with ash or sand and roasting. The ash or sand helps to achieve uniform spread of heat and avoids burning the nuts. According to the local processors, roasting may take up to two hours and more, if the nuts are not well sun dried. Thereafter, the roasted nuts are sieved out of the ash and sand and cleaned with leaves. The nuts are then put into a mortar and pounded into a crush. According to most processors this is the most labor-intensive activity in the process. After crushing, the grits are ground into a fine powder using a grinding stone. The powder is then mixed with boiling water. The paste–water mixture is boiled for some time to release the oil and then left to cool. Oil settles on the top and is removed, leaving the residues in the water. The *Shea* oil produced by this method has a nutty, roasted flavor that is preferred by the local community.

Cold press

The cold press method promoted by COVOL is used to produce *Shea* butter that can be used by industrial or cosmetics processors. For this process, the dried nuts are crushed and ground into powder. The powder is mixed with hot water and poured into a bag that is then placed in a container. It is hand-pressed and the oil filters through the bag into the container. According to reports from Sudan, for a family of five women who process 4 liters of oil every 2 weeks, this means that 130 work-days/year are required for women to process their oil requirements. Using the COVOL technology, the women obtain a higher quality product and can produce about 4 liters in 30 minutes or up to 40 liters in one day. The products and equipment required for cold processing are shown in Figures 9–12.

Profit, higher in the peak than in the lean season, is a combination of the gross margin made on processing the oil and the returns from trading it in the market. Although not particularly great, the profits can be the most important part of a woman's contribution to household income.

Across the *Shea* belt, individual women process the nuts into oil, which they retail in local markets. In Lira main market there are about 10 women who process on a small scale. These form the main trading chain for the nut wholesalers. They buy 120 cups of the nuts weekly from wholesalers inside the market.

The women rely on both hired and family labor to process the oil. In the town markets, hired labor is mostly used while in the rural areas, family labor is common. Processing is done in smaller batches of 40 cups weighing 16 kg. From this, a full 5-liter jerry can is obtained. On average, they process 15 liters of oil/week. See Table 13.

Average sales/person/week amount to about 15 liters. During periods of peak demand, volumes/week double, but the number of processors may fall due to scarcity of the nuts.

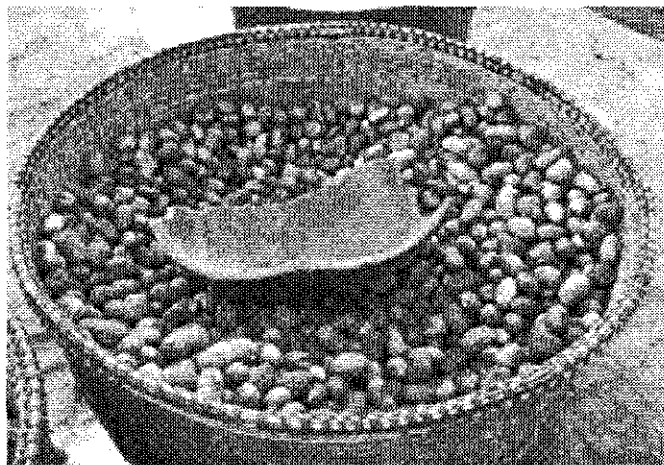


Figure 9. *Shea* nuts dried for processing.

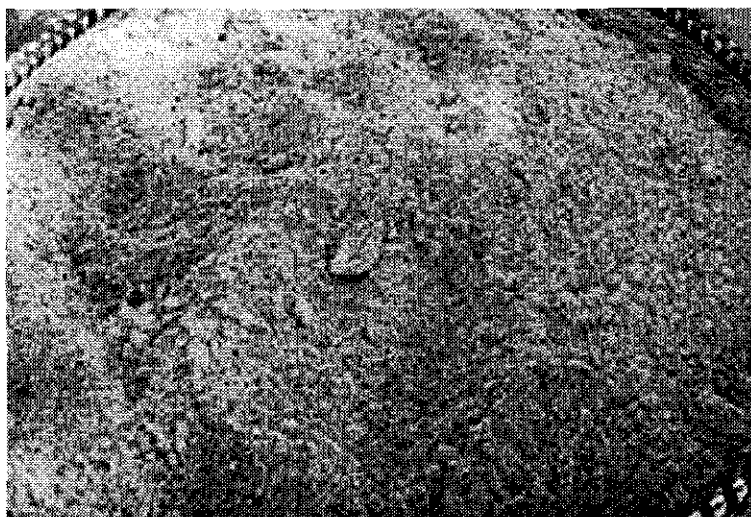


Figure 10. *Shea* grounds that are mixed with hot water.

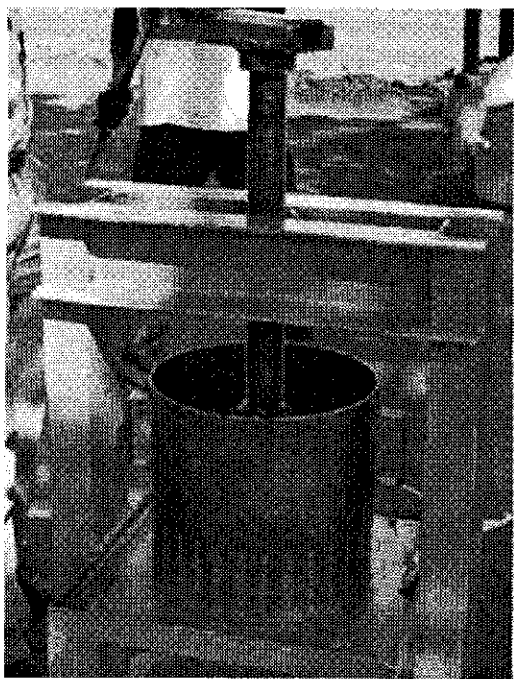


Figure 11. *Shea* oil screw press.



Figure 12. *Shea* by-product after processing.

Table 13. Costs, revenues, and profits of a typical crude *Shea* oil processor.

Analysis of profitability: processing and selling 15 liters of crude *Shea* nut oil produced using traditional methods

	Peak <i>Shea</i> season		Lean <i>Shea</i> season	
	Ush	US\$	Ush	US\$
Operating costs—variable				
Raw material cost	14,400	8.23	32,400	18.51
Firewood	2,506	1.43	2,506	1.43
Water	1,504	0.86	1,504	0.86
Labor	1,804	1.03	1,804	1.03
Subtotal variable operating costs	20,214	11.55	38,214	21.84
Operating costs—fixed				
Market dues (4 days)	800	0.46	800	0.46
Subtotal fixed operating costs	800	0.46	800	0.46
Subtotal operating costs	21,014	12.01	39,014	22.29
Capital costs	0	0.00	0	0.00
Revenue	30,072	17.18	45,108	25.78
Profit (loss)	9,058	5.18	6,094	3.48

Marketing systems (including estimated margins in the supply chain)

Processors have several sources of nuts depending on seasonality and socioeconomic factors. During the peak season, processors get nuts from gatherers while in the lean period, wholesalers provide the main supply channel (Fig. 13.)

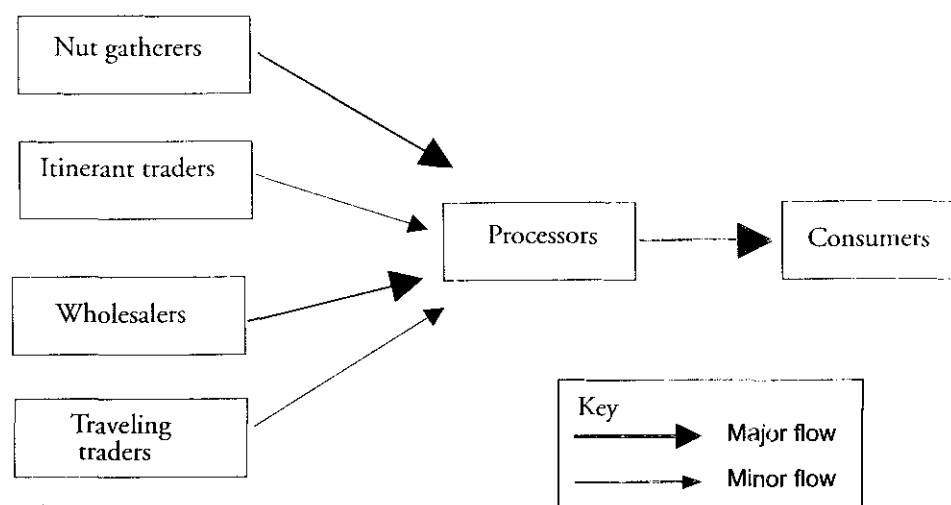
**Figure 13. *Shea* oil trading chain.**

Table 14. *Shea* oil trading costs and margins in the peak season.

Processor	Peak season (Ush)	Margin	Lean season (Ush)	Margin
Raw material cost	4,000		8,000	
Income	9,000	56%	14,400	44%
Processing costs				
Miscellaneous labor	1,000		2,000	
Firewood	1,500		1,500	
Total costs	2,500		3,500	
Net income	2,500	28%	2,900	20%

For an estimation of trading costs and margins accruing to small-scale women processors across the *Shea* belt, see Table 14. Variations were found to exist, depending on whether family labor was used or not, the source of nuts, and seasonality.

Expansion in Uganda—opportunities and constraints

In northern Uganda, supply appears to be in balance with demand which, according to several of our informants, is fairly constant throughout the year. Although market prices rise on a seasonal basis, this is caused by an increase in raw material (*Shea* nuts) costs rather than a reduction in processed volumes. The desirability of expanding supply is unclear. Given the lack of direct substitutes for traditionally processed crude *Shea* oil, one might expect demand to be inelastic. However, households have the ability to process their own *Shea* oil, suggesting that market demand may be elastic. In this uncertainty, the extent of the downward pressure on prices arising from an increase in supply is difficult to predict. Ultimately, the type of people who purchase *Shea* oil and those who market it are the same, and so, even if suppliers should lose out to consumers (or vice versa) as a result of increased supply, the welfare of the northern Ugandans as a whole should increase.

From our limited fieldwork, the following appear to constrain processing.

- The expense of transport, either in fares or time spent providing own transport.
- Scarcity of nuts in the lean season.
- The price of nuts in the lean season (perhaps implying a cash flow problem).
- Poorly dried seed.

Sales and market taxes were also mentioned but we have no objective measure of whether these are burdensome.

Implications for the environment

Given the importance of *Shea* in the income and food security of the women in the north of Uganda, and the fact that this is most economically depressed region of the country, there is scope to consider some of the more social benefits to investment relative to economic agribusiness type interventions. If one accepts that a marketing approach will not work for everyone, as clearly shown in industrialized nations where depressed regions are given strong social support programs, then several options may be considered.

Increased revenue from *Shea* oil sales should encourage people to conserve *Shea* trees. It is unlikely that *Shea* oil production will increase to the extent that the *Shea* resource will be put under such pressure that it is no longer available. Increasing demand would also tend to create a pull for *Shea* from southern Sudan.

At present, the level of cross-border trade between Sudan and Uganda for *Shea* is minimal. Reports from southern Sudan, however, indicate that *Shea* is in plentiful supply and would be processed in greater volume if a market were identified.

Potential for *Shea* olein within the Ugandan market for cooking-oils

The Ugandan market for cooking-oils and vegetable fats is dominated by low-cost products, mostly produced from imported crude palm and sunflower oil and domestically grown cotton and sunflower seed. US cooking-oil from USAID's PL480 program is also sold, but in quantities that are purported not to distort the market. The size of the vegetable oil market is estimated at approximately 44 000 t (Otimodoch and Singh 2000) and is growing at about 2%/year; 65% of cooking-oil is currently produced from imported raw materials.

According to reports, there are plans to install a solvent extraction plant in northern Uganda with a capacity of 500 t/oil/day. The plant will be supplied with oilseed grown on a 10 000 ha company farm and on a considerably larger area owned and managed by outgrowers. If this plan is realized, Uganda will probably become self-sufficient in oil seed production.

Consumption of vegetable oil and fat is highly price sensitive and consequently brand loyalty is low, at least among poor and lower middle class consumers. Wealthier consumers prefer "big name" company products, which they associate with quality and status (pers. comm. William Mollah, Research International).

Crude *Shea* oil and olein

Crude *Shea* oil can also be used as a cooking-oil, either directly or fractionated to yield stearin and olein. The stearin is valued too highly on domestic and international cosmetic markets to be used as a cooking-fat. However, *Shea* olein has yet to find a substantial international market and therefore could be sold as a cooking-oil on the Ugandan market. *Shea* olein is gold-colored oil, the quality of which has tentatively been compared with olive oil (Maranz and Wiesman 2000).

Consequently, *Shea* oil could potentially be marketed to the small but probably growing group of wealthier Ugandan consumers who appreciate quality in ingredients for cooking. If it were produced in any quantity, it would have to compete on price with refined vegetable oils. Our financial analysis of Mr Jones oil mill in Lira suggests that this could be done profitably (see page 57) assuming that a reasonably valuable market for *Shea* stearin could be found in the local cosmetics market.

Sources of supply

An organization such as NUSPA could supply nuts and/or *Shea* stearin to agencies involved with cosmetics and then supply cold pressed *Shea* stearin to the cooking-oil market.

Alternatively, COVOL has the capacity to supply olein as a by-product from its fractionation process. Assuming that COVOL continues to supply *Shea* stearin to the valuable cosmetics industry in the US, the organization could probably sell *Shea* olein at a price that is competitive with the vegetable oils that currently dominate the market. This aspect much depends upon the levels of processing that COVOL undertakes. If Guru Nanak Oil Mills implements its plans to produce *Shea* stearin for the export market, there could be up to 600 t of *Shea* olein available to the national vegetable cooking-oil market. Mukwano Industries also plans to extract and export crude *Shea* oil. However, if the company went one step further and fractionated its crude oil, the total amount of olein on the Ugandan market could rise to as much as 1700 t. *Shea* olein could, in this case, be sold as a virtually new product, refined *Shea* oil. If this were not successful, then it could be blended with the other refined oils.

Expansion in Uganda: opportunities and desirability

For *Shea* olein, expansion means moving from very small and irregular production to substantial tonnages. Whether this happens will depend on private sector decisions that, to a large extent, are beyond donors' influence. There is an opportunity to supply a competitively priced *Shea* olein product to the expanding cooking-oils market. As a by-product of *Shea* stearin export production, *Shea* olein could be sold as a highly competitive product. Sales of crude *Shea* oil on national and possibly regional markets depend crucially on consumer preferences and how cleverly the product can be marketed.

Potential constraints to expansion

- Commercial decisions not to extract and fractionate *Shea* stearin and olein. Although current interest from Guru Nanak Oil Mills is high, many factors could persuade its owner not to proceed.
- Adverse changes in the international markets for stearin. The international cosmetics market for stearin will become more integrated, meaning that the very high prices that some buyers are willing to pay will decline. The current situation is that *Shea* stearin is being sold into the CBE market at US\$0.60/kg and virtually the same product is being wholesaled into the cosmetics market at prices ranging from US\$5 to US\$25/kg.
- Insufficient supplies of *Shea* nuts.

Economic implications in northern Uganda

Shea nuts will become a more valuable resource. Due to remoteness and scattered distribution, further exploitation will have to involve poor local people. This will help to spread the economic gains from the new *Shea* industry among poor communities.

As long as industrially extracted crude *Shea* butter is not marketed in the north of Uganda, the only danger to traditional processing activities would be if competition for the *Shea* resource pushes nut prices upwards.

The major danger to expanding this market would be overexploitation of the other activities, such as wood usage, charcoal burning, and land cultivation.

Reactions to *Shea* in cosmetic products and cooking-oil

Background

In Northern Uganda, *Shea* oil has a current market in its crude form for various household uses:

- Cooking-oil.
- Food accompaniment and/or flavor enhancer.
- Cosmetic use (moisturizer, skin protectant) healing cream.

Commercially, a fractionated version of the product—stearin—receives high unit returns when sold to the US cosmetics market but export volume is very low. Commercialization of the product on a local scale has been unsuccessful to date, possibly because of the following.

- Lack of promotional support.
- No clear communication and understanding of benefits.
- Confusion in consumer perception of the oil.
- No serious investor.

The benefits of *Shea* oil are not currently valued and the product competes in the market purely on price.

USAID, through support to the appropriate commercial or community organizations, wants to promote sustainable development in northern Uganda. Trade in renewable *Shea* tree products could potentially promote economic growth while protecting the natural environment. Research is needed to investigate the potential of cold-pressed and traditional *Shea* oil products for local and regional markets.

In order to gauge the potential for developing a domestic or regional market for *Shea* products, a series of focus groups were convened with women in October 2001 in Kampala and Lira. Findings from these studies indicate there is potential for developing value-added *Shea* cosmetic products for a domestic market of western expatriates, upscale Ugandan women, and Asian women. The interviews found that most respondents had never heard of *Shea* before. However, all respondents reacted very favorably. These benefits of these products—healing and moisturizing—combined with the emotional benefits of being “organic”, “all natural”, “environmentally conscious”, and “made in Uganda” created a very appealing proposition. For expatriate women, the additional emotional benefits of community trading and women’s empowerment were valuable, but to a much lesser degree for the Ugandans.

Findings from this study should be seen as indicative rather than conclusive. The focus groups results are helpful in defining the perceived strengths and weaknesses of *Shea* products, as well as creating a clearer understanding of the potential market and its defining parameters.

1. Based on the positive response to the cosmetic concepts, it is recommended that USAID consider further support to the development of value-added *Shea* products for the potential domestic market.
2. It will be important to keep in mind—especially in the early stages—that there is virtually no knowledge of *Shea* and its benefits, and as a result there is no ready market. These will not be market-driven products. If a budget is dedicated to product development and processing, a budget will also have to be dedicated to market development. Without this, *Shea* products will continue to reside in obscurity.
3. Cosmetic products that could be developed are soaps, lotions, lip balm, and solid hair oil.

To merit charging a premium, the products must be aesthetically pleasing, taking the following key criteria into account:

- Scent (must be pleasing and not smell like *Shea*).
 - Appearance (should look natural but not too homemade).
 - Packaging (natural but upmarket).
 - Perception of import quality.
4. With regard to sales of high-quality *Shea* oil, despite a demonstrated level of interest among Lira women, it is not recommended that an improved *Shea* cooking-oil be pursued at this time.

Before proceeding any further, the following two key questions should be addressed:

- Will it be possible locally to produce and package value-added *Shea* products to meet the criteria of the discerning market as described above?
- Will it be possible to support product development and processing with a substantial marketing budget?

Methodology

A series of focus groups were conducted among three groups: expatriate women living in Kampala (from Europe and North America), Ugandan women living in Kampala and Lira, and Asian women based in Kampala. The majority of Asian women approached were unwilling to leave home without their husbands and were interviewed in their homes in a separate series of meetings. The Lira groups focused primarily on the cooking-oil sector and were conducted in Luo, the local language. Separate discussion guides were designed for each group of respondents, each following a specific line of discussion touching on all the required topics.

A maximum of eight women attended each focus group that lasted approximately two hours. Each woman was given refreshments and a cash incentive for attending the group, which encouraged and ensured participation from all respondents. As stimulus material, respondents were shown several concepts of *Shea* butter and were also shown a collection of *Shea* products ranging from locally produced butter and oil to products produced in Britain, France, and the US.

Brands shown:

- L'Occitane *Shea* product line including soap, oils, and creams
- Body Shop
- Nilotica high-value creams
- Locally produced soaps
- COVOL oil and butter
- Local oil

During the field visit to Lira, an oil-milling factory was visited (Guru Nanak) as well as the local town market where several oil vendors were informally interviewed. Several retailers were visited in Kampala.

Detailed findings: cosmetics

Current usage and attitudes

Expatriate women. Expatriate women are far more entrenched in beauty and cosmetic routines than their Ugandan counterparts. All women interviewed bathed daily, sometimes twice a day. They used a wide range of soaps, some bought here in Uganda and some brought in from home leave. Most expatriate women have established a routine of cleansing and moisturizing in the morning and evening and indicate a high degree of brand loyalty, especially where the face is concerned. Some women had been using the same brand for over 10 years. Brands used are all well-known and high-end:

- Clarins
- Neil's Yard
- Clinique
- L'Oréal
- Elizabeth Arden
- Body Shop
- Vichy
- Lancôme

Expenditure on face creams is a given for these women and needs no justification. Many of the women interviewed use a day cream as well as a night cream which is reportedly richer and more "reparative".

These women believe that by living in Africa they are more exposed to sun damage than their European counterparts and so are more likely to use expensive products to counter the effects of *aging*. "They say that for the skin, one year in Africa is like three years anywhere else". Ironically, none of the women in this group used sun protection in their daily routines. For all-over body moisturizing, this group agreed that because of the humidity in Uganda, there is less need to moisturize their bodies than in their native countries. They do moisturize if they have been swimming or lying in the sun, or when preparing for a special evening out. When moisturizing the body, there is less brand loyalty and less of a tendency to spend highly. Products are more of a supermarket variety: Revlon, Vaseline, Johnson and Johnson. Only one woman stuck to her line of products for all skin-care (Clarins).

Ugandan women are less brand-loyal. They are aware of the numerous brands available, but tend to roam among brands of soaps, creams, and oils. This group is also far less likely to differentiate between moisturizer for the body and for the face, or to spend highly.

Brands used are as follows.

- Mary Kay
- Pixie
- Revlon
- Shelly Cream
- Faraway
- Fair and White
- Fair and Lovely
- Comfort
- Clear
- Nivea
- Soft and Free
- Protex
- Vaseline
- Cussons
- Mekako
- Black Star
- Clear Essence
- Body Shop

Ugandan women. For Ugandan women, South African, British, and even Kenyan products are seen to be superior to Ugandan. They have better packaging, better promotion, and, by association, better content. Ugandan women in the north use *Shea* butter for “smearing”. They use it as a moisturizer but only for babies—adults do not use it because of the smell.

Asian women. Three in-depth interviews and a focus group were held with women of South Asian heritage to explore the potential of *Shea* cosmetic products. The women were all of Asian descent; some were born in Uganda, others in India and Pakistan. One woman was of mixed descent, Ugandan/Asian.

Overall, findings from this research support the original report: *Shea* products have great appeal. These women especially liked the natural healing properties as a proposition. While they are fairly entrenched in their habits of moisturizing and are not looking for a new product, *Shea* as a healing moisturizer presents a whole new concept. These women can also see real benefits in locally manufactured products. As we heard in the other groups, the biggest challenge that locally manufacturers of *Shea* products need to address is the smell. It will be important to create a pleasant smelling product while still retaining the natural positioning and the product benefits. Packaging comes a close second. Again, a marketing campaign will be necessary to communicate both the emotional and physical product benefits.

Brands and products

All the women agreed that living in Uganda made their skin darker and more susceptible to sunburn and peeling. In terms of cosmetic use, they have a tendency to use powder alone on their faces and lotions only on their bodies.

Brands and products used by the respondents include the following.

- Amla
- Coconut products
- Nivea
- Glycerine
- Gentelle Intensive Care
- Vaseline Intensive Care
- Johnson and Johnson
- Palmers' Cocoa Butter

–As far as brand use is concerned, loyalty is largely bred out of complacency rather than a really strong sense of loyalty: “If there is no problem with the product I use, I will continue to use it”.

–An element of heritage creeps into loyalty; if a family has used a product for a long time, the women will continue to use it. They also feel an affinity for products “Made in India” as they feel these have their needs in mind.

Where do women buy these products? Expatriate women tend to buy their cosmetic products while on home leave. They also have a tendency to stockpile for the year ahead. Some of the brands and products used (i.e., l'Oréal) are available in Uganda now, but at a significant mark-up and women don't like paying more than they need to. Duty Free counters are a popular place for buying cosmetics—if they are buying a product they are already using. All women in this group said that they preferred speciality shops if they are trying a new product, partly for the expert opinion, partly for the relaxed atmosphere, and partly for the pampering. Soaps and body lotions, however, are bought in a myriad of retail outlets, from chemists to supermarkets to speciality shops. Lotions and soaps are bought locally but are generally imported. There is a real lack of knowledge of any Ugandan products, and the general feeling is that Ugandan products are bound to be inferior.

Ugandan women are divided into two camps: the younger, more brand-savvy women (19–30) are likely to shop at Pioneer Mall for their cosmetics. There are two speciality shops there that deal in beauty products. Another shop, Avoa, on Buganda road, was also cited. Some women buy their products from the beauty salons where they go for treatment. As with the expatriates, these women are looking for an outlet offering advice and a level of customer care. They trust these shops and the products bought from them.

There is great concern that there are too many product rip-offs in Uganda. Consumer protection is in its infancy and women see cosmetics as a prime target for rip-offs and scams. These women do not buy from town, from the hawkers or from *dukas*, as they suspect that the products are not *bona fide*. They also suggested that Ugandan products are far more likely to be rip-offs than imports.

The older women (35–50) are far less likely to care about these things and tend to buy their beauty products at supermarkets for ease. They have full-time jobs, children at home, and no time to shop, especially for cosmetics. (They will, however, sit in a beauty “saloon” for two days to have their hair done for a special occasion.)

Asian women buy their beauty and cosmetics products in shopping malls, pharmacies, and other retail outlets. Unlike the other women, however, the Asian women are buying products for family use, not for themselves alone. As a result of the family-oriented purchase, these women are looking for large containers. Small “boutique” packages do not appeal to them.

Why choose one product over another?

- Word of mouth is one of the most powerful means of influence. Women in all groups talked of friends suggesting that they try a certain brand or product.
- Advertising is also very influential in calling attention to the product. The younger Ugandan women spontaneously cited several advertisements that influenced their decision and openly scoffed at some of the advertisements produced in Uganda (e.g., Sleeping Baby).
- Packaging has a tremendous impact, especially where on-pack copy is concerned. Words that draw the consumer in are “natural”, “anti-aging”, “smooth skin”, and “revitalizing”.
- Ugandan women are significantly more likely to read labels that list the ingredients. They are ever watchful for hypochlorite, a bleaching agent. In the group discussion they said that they would never buy a product that contained this ingredient.
- Despite all of the above factors, women will not continue to use a product if it doesn’t appear to work for them.
- Younger Ugandan women will switch brands if they feel that their current brand is becoming “too common”. As they become more sophisticated as consumers, they want to stay one step ahead of the trend.
- Product ingredients and descriptions play a significant role in influencing the purchasing behavior of Asian women. Words or claims that are particularly appealing are “natural”, “easily absorbed”, “healing”, and “anti-aging”.
- Smell is very important
- Asian women are ever watchful for hypochlorite that irritates sensitive skin.
- Advertising does play a significant role in influencing attitudes towards products, but Asian women were adamant that unless something was wrong with the product they were currently using, they were not likely to switch.

Ugandan products: attitudes

In general, when the Ugandan groups approved of a local product, it was generally agricultural in nature: fruit, vegetables, meat, tea, and sugar. Coffee is not widely consumed in the Ugandan population and many people do not appreciate the fine coffees that Uganda produces. Most Ugandans who drink coffee consume processed instant coffee. There appears

to be an underlying lack of faith in any Ugandan value-added product despite awareness that Uganda could produce many more consumer items.

Current perceptions are that Ugandan products are inferior to imports. As far as the respondents were concerned, the following problems were identified with domestic products.

- Ugandan oils are not refined.
- Ugandan clothes shrink fast and tear more easily.
- Ugandan packaging is unattractive.
- Ugandan manufacturers don't really care about quality.
- Uganda products are duplicated—cheaply and badly—by imitators, and consumers have no recourse.
- Quality control is not so much an issue as it is with other imported products.
- Imported products are seen to be superior to Ugandan products.
- There was concern around the duplication of local products— as was seen with the Ugandan women—which appears to be a significant barrier to buying domestic products.
- It was generally accepted that Ugandan products are not as good as imports from UK, Europe, and the USA.
- The women unanimously agreed that Ugandan packaging is inferior (poor quality, unattractive) which also influences their attitudes towards domestic products.
- On the positive side, domestic products are likely to be more affordable, easily accessible, and any queries or concerns can be forwarded with ease to the manufacturer.

There was a real scepticism among the Ugandan women about Ugandan-Asian manufacturers with an undercurrent of belief that these manufacturers generally compromised quality in pursuit of a profit. Several women even said, as the conversation progressed, “Do not let an Asian develop these products for you”. The suggestion was, should this be the case, this segment of the market would be lost due to this preheld scepticism.

Shea products—cosmetics

The women were all shown written concepts describing *Shea*, the origins, the properties, the physical benefits, and the potential emotional benefits. These concepts were devised from numerous articles found on the Internet and edited to suit the focus group environment.

Segments of the concepts have been isolated and expanded below, but the key finding here is that gestalt (i.e., “the whole is greater than the sum of the parts”) of the benefits is far more powerful than individual concepts.

Healing and moisturizing. The response was overwhelmingly positive to these concepts. Spontaneous links to cocoa butter and Aloe Vera were made, but it was acknowledged that there was no known cream that achieved both healing and moisturizing. This was the most appealing positioning of the product for Asian women who were mostly interested in the healing attribute as they are presently content with their moisturizing lotions. A natural healing cream is a novel proposition. “I would consider using this for my son who

has eczema. We have tried so many different things and nothing so far has worked". Some women felt that *Shea* sounded rather rich and were afraid that it might cause breakouts and spots. As a night-cream, it sounded conceivably effective, and as an all-over moisturizer and after-sun cream, it sounded ideal.

Organic, Natural. Conceptually, these are great selling points. Expatriate women have been buying into this concept for years, and Ugandan women are beginning to see the advantages. For the Ugandans, there is particular concern about the addition of bleaching agents.

It is important to note, however, that consumers today are increasingly sceptical, and terms like these are open to abuse. This led to a debate in several of the groups whether preservatives should be allowed in "natural" products; 100% organic products are more likely to go rancid or smell bad, but by adding a preservative, you lose the organic status. It was agreed that a preservative was acceptable.

Conceptually, these are great selling points, but the women were willing to trade these benefits for a better smelling product.

Environmentally friendly. The women unanimously supported the environmentally friendly concept of *Shea* products. Deforestation is becoming an increasingly salient issue in Africa, a concern borne by both Ugandans and expatriates alike. The fact that the *Shea* nut harvest for oil production protects the trees from being felled is an extremely appealing factor. In addition, it was understood that the *Shea* tree is indigenous to the area (not a plantation tree) and, as a result, preservation of the trees became more significant to the respondents. All the Asian women supported the environmentally friendly concept of *Shea* products but they did not see this as a key factor for them.

Tradition, heritage. While there is a current global fascination with traditional remedies, this concept was not altogether convincing for the respondents. In fact, this is possibly a turn-off for some of the younger, more modern, urban Ugandans who are shrugging off their heritage in the pursuit of sophistication. The scientific explanation of *Shea's* beneficial properties was far more effective, and relevant. For the Asian community, this proposition was interesting, but not a particularly strong selling point. The product performance is far more important.

Community development, women's groups. Again, this concept had higher cachet with the expatriate women whose collective consciences have been bombarded with "responsibility" issues for years. Buying a product that helps a community, especially a women's cooperative, adds a deep "feel good" factor. The Ugandan women, while they were not opposed to this concept, felt that these women in Lira were simply doing their job...they didn't want to have to think about it. This concept had very little appeal to the Asian women interviewed.

Poverty alleviation. This concept is a little less personal and a little less "visual". Many of the respondents liked to feel that they are making a contribution and supporting those less fortunate than themselves. The Asian women thought this concept had no value—they dismissed it as "irrelevant".

Sample products

A number of products were brought to the table for the women to try: creams, lip balms, and soaps. The women were impressed and a little surprised that *Shea* products were already being produced elsewhere, which gave Ugandan *Shea* a little more credibility.

The locally produced soaps were well liked (produced by Jane Bates). Respondents particularly liked the inclusion of herbs, both from a scent perspective as well as a textural perspective. The imported hand cream and moisturizer (produced by l'Occitane, mixed with honey and African flowers) also met with rave reviews, in particular for the scent and the packaging. Expatriates liked the soap from l'Occitane but Ugandans did not. Nilotica packaging was well-liked (green glass jar) but the lemony scent was overpowering.

The pure *Shea* butter was then passed around and while all agreed that it had a very unpleasant smell, all liked the texture and how it made their skin feel. It was understood that this was 100% pure *Shea* butter, and could be reduced to a lower content, as for l'Occitane at 20% *Shea* products. As long as the ingredients were natural and *Shea* was one of the primary ingredients, respondents were still positive. The same line of product samples was produced for the Asian women, with the following responses.

The three most appealing products were the 15% *Shea* body lotion from l'Occitane (said to be “perfect”), the pure *Shea* butter from Uganda (but without a scent), and the hair conditioner (from the Body Shop). All of these products could be seen in everyday use for the whole family.

The glass Nilotica packaging was the best liked; the plastic packaging was considered too “down-market” and didn’t communicate quality, healing, and moisturizing.

Where would you buy them? Many respondents suggested that a speciality shop should be opened in Kampala that showcased natural Ugandan products like this. A dedicated shop would prevent low quality imitations and provide the level of trust that many women need. Others suggested Pioneer Mall, Banana Boat (Kisemente), and Avoa (Buganda Road). Expatriates added that they would certainly buy lots of soaps and creams to take back to their home countries as gifts.

All the Asian women agreed that the best places for them to buy these products would be pharmacies and beauty salons. Again, as we saw with the other groups, these places are more trusted than the average supermarket, shop, and hawker.

The owner of Avoa, Ori Kahana, was interviewed following the fieldwork and indicated a willingness to further explore *Shea* products. She is currently making her own products and uses *Shea*. Other manufacturers (UKI, AVIS) are interested in *Shea* but are not yet using it.

Shea products—cooking oil

Current usage and attitudes

All the women use cooking oil. They listed the oils by type or brand, e.g., cottonseed, sunflower, *Shea*, Muzigo, and Mukwano. To these women, Mukwano appears to be a type of oil rather than a brand or manufacturer, which is an indication of how unaware of brands

women in the rural districts are compared to their more urban contemporaries. (According to the Lira oil-miller, Mr Singh of Guru Nanak, the Mukwano oil is generally a mix of sunflower oil and imported palm oil but the women just call it Mukwano.)

Oil is bought daily in various forms of containers.

- *Cavera* (plastic bag).
- Small tots or shots.
- Small liquor bottles: ¼ liter.
- Larger liquor bottles.
- Jerry cans: 5-, 20-liters.

Mukwano is perceived as the better oil. Women refer to it as refined. Sunflower oil is recognized as being locally produced but its heaviness and thickness are less desirable.

Mukwano and sunflower oils are used for frying on an everyday basis use and, generally, the women buy it on a daily basis in small quantities. A clear product benefit of these types of oil, however, is their ability to withstand storage. Other oils tend to go rancid very quickly. Cottonseed oil is used by Lira women but not greatly liked because of its foul smell.

Shea oil is generally used more as a flavor enhancer than as a cooking-oil. Muzigo (cow fat) is used in the same way. The roasted-nut taste of *Shea* oil is said to add a distinct flavor, and many women believe that adding a spoonful of oil creates a richness of texture that will ensure the belly is filled more quickly. Several women said that the distinctive flavor of *Shea* is part of the reason they do not use it more frequently: they tire of it. The paradox is, without this distinctive flavor, they would not buy it.

There was great interest in the refined oil shown to the groups. They were impressed that their traditional product could be improved. If quality could be guaranteed (and the product priced consistently) the women were definitely interested in a value-added product. This should be treated with an element of caution, however, as economics and behavioral patterns suggest that the women will not change their purchasing habits.

They felt that the color was too light and that, as a result, the flavor would not be the same, but made suggestions about improvements. "You need to roast the nuts more or else you won't have the flavor". It is possible that there could be a slow evolution away from other oils towards improved *Shea* oil, but the women are very entrenched in their habits and views. Without a high degree of sensitization about the benefits of *Shea* oil versus the sunflower and Mukwano oils (i.e., *Shea* oil does not smoke at high temperatures), *Shea* will continue to have its niche as a flavor enhancer or speciality oil in the north.

Where do women buy these products? Women in Lira are not economically well off and tend to buy oil when they can. This means they buy in small volumes on a daily basis. Oil is bought at the market, from a *duka* (small wooden hut) or direct from the processor (more cheaply). Sometimes the women process it themselves despite the amount of time and effort required.

Although *Shea* is available in the markets year round, the price fluctuates dramatically due to seasonal availability and prices become up to 100% higher in February–April. Pricing for other oils remains stable throughout the year. In addition, many women complain

of the erratic quality of processing and say that the oil can be bitter if the roasting or the extracting had not been done correctly. The quality of other oils remains consistent.

***Shea* butter uses and concentrations**

Ugandan cosmetics industry

In a rapid survey of the local cosmetics companies in Uganda, the response to the possible use of *Shea* products was favorable.

Company A purchases 300 t/month of stearin at a cost of US\$350/t. They import their materials and would be interested to learn more about local supplies. The quality of the stearin was, however, paramount. The company would be interested to conduct trials with a supplier and would also like more information on product quality tests and market acceptance.

Company B provided no information on levels of stearin usage, but indicated that all the materials were imported. The company had heard about *Shea* and would be willing to trade in *Shea* if a supply of good quality materials at low cost were available.

Company C is producing cosmetics (lotions, shampoo, creams, liquid soap, and beauty products) and uses a range of materials including the following.

- *Shea* butter.
- Synthetic stearic acid.
- Fatty acids.
- Sunflower oil.
- Essential oils.

At present, the company buys 200–300 kg/month of *Shea* butter that it uses in the manufacturing of creams and lotions. When soap making begins, about 500–1000 kg/month could be utilized. The *Shea* butter used in this plant is supplied by Mr Singh (Guru Nanak Oil Mill), and produced locally in Northern Uganda. A similar quantity of synthetic stearic acid is used and imported from the UK.

The company noted that *Shea* possesses very good skin-moisturizing properties. It is also a very good skin softener and less expensive than imported raw materials. Limitations in using *Shea* butter include the lack of purification, a potential for contamination by antioxidants, and an uncertain shelf life. According to this company, the future for *Shea* looks bright; the company may utilize about 2 t/month of *Shea* butter in the manufacture of cosmetics and soap.

International cosmetics industry

Shea butter is used in cosmetic products including ointments, creams, and lotions. Because of its high content of unsaponifiables, it is mostly appreciated for facial, hand, and body-care products, giving a very pleasant, smooth feeling to the skin. *Shea* is also recommended for lipstick, make-up, sunscreen formulations, and preparations for sensitive skins, due to its anti-inflammatory qualities. *Shea* butter may also be used in hydrophobic (oil-based)

products, or in the oil phase of formulations for cosmetics, toiletries including soap, and over-the-counter (OTC) pharmaceutical preparations (Table 15).

Depending upon the formulation and budget, one will most likely want to choose a level which will take into consideration cost–effect and efficiency in the formulated product.

Two commercial options for *Shea* incorporation into products are as follows.

- Companies seeking to improve their label “value” with *Shea* butter use below 5% of the product.
- Companies that want to improve product performance through *Shea* butter use 10% and more of the product.

Supply and demand in the world market

The main cosmetics buyers of *Shea* butter/oil are located in Europe and the US. Although *Shea* butter is used extensively in Japan’s food industry, it is not used in the country’s substantial cosmetics industry (Bekure et al. 1997). European and US cosmetics companies buy from a variety of sources, depending on their requirements. A large proportion of *Shea* butter for use in cosmetics is purchased from the food industry in a highly refined form (de Saint Sauveur 1999). Such butter is cheap (having usually been obtained through solvent extraction), readily available, reliable in quality, and does not become rancid. However, the refining process removes most of the sun-protection, healing, and antiseptic qualities of the natural butter. Despite this, most of the larger cosmetics companies prefer to use refined butter because of the natural product’s reputation for unreliable quality and the occasionally high content of free fatty acids, the cause of rancidity (de Saint Sauveur 1999). This also enables the producer to label the product as a *Shea* formulation.

Smaller companies and specialist cosmetic ingredient suppliers are willing to buy unrefined *Shea* butter from Africa. However, concerns over quality have forced them to become intimately involved with its production. In some cases, buyers prefer to buy *Shea* nuts and

Table 15. Options for *Shea* cosmetics products.

Skin care	OTC pharmaceuticals
Sun care and after sun products	Topical analgesics and anesthetics
Hand and body lotions (oil phase)	Hydrocortisone creams
Shaving and depilatory preparations	First aid creams
Glamour cosmetics (hydrophobic)	Anti-acne preparations
Bath oil	Rubs, liniments, and ointments
Facial moisturizers	
Sport	Internal and oral applications
Athletes and sportsmen’s creams	Lip balms and lipsticks
Body butter	Oral ointments

extract the butter themselves. This approach has been adopted by the French company Teco Industries that is one of the largest suppliers in the world of unrefined *Shea* butter for cosmetics.

When sourcing butter directly from Africa, buyers tend to form exclusive relationships with African suppliers, thereby creating discrete marketing chains. This lack of market integration creates a situation where prices offered for essentially the same type of *Shea* butter can range from as little as US\$1/kg fob to as much as US\$60/kg cif.

In Europe, cosmetics manufacturers have tended to use *Shea* butter in small quantities to add specific qualities to their products. Product promotion has paid no attention to the *Shea* butter content. More recently, however, several European companies have introduced products that contain large proportions of *Shea* butter. Promotion of these products has focused on the additional health-giving properties of *Shea* butter.

In many instances, US cosmetics companies have treated *Shea* butter rather differently from their European counterparts. They have concentrated on selling *Shea* butter products into the “ethnic” and “natural product” market sectors (Bekure et al. 1997). *Shea* butter content has been high and promotions have concentrated on the origins of the butter and its natural qualities. Large-scale US cosmetics manufacturers also use *Shea* butter, although they almost certainly buy refined *Shea* butter sourced from Europe.

The fragmented nature of the international *Shea* butter market means that no precise information is available on the quantity of *Shea* butter used in the cosmetics industry. Estimates range from 400 t/year to over 1500 t (Jaeger 1999).

After an initial period of interest in the 1970s, sales of *Shea* butter to the cosmetics industry declined. However, interest has now revived and the market is almost certainly growing. The rate of growth, however, is unknown.

Ugandan *Shea* oil

International buyers have traditionally purchased West African *Shea* butter that, as previously noted, is much harder than the *Shea* oil from East Africa. Consequently, international buyers tend to expect hardness. COVOL has tried to reproduce the qualities of the West African butter by fractionating *Shea* oil to produce *Shea* stearin (de Saint Sauveur 1999). However, there are at least three reasons why East African crude *Shea* oil or even *Shea* olein has advantages over the West African product.

1. East African oil penetrates the skin more easily. Americans and Europeans prefer this quality.
2. East African *Shea* oil can be incorporated directly into an emulsion without further processing.
3. *Shea* is very good for the hair but the hardness of the West African butter limits the amount that can be used in hair formulations. East African *Shea* oil does not present these problems (de Saint Sauveur 1999).

East African *Shea* olein may also have considerable potential. After fractionation it remains high in unsaponifiables and vitamins. This makes it particularly suitable for moisturizing creams (de Saint Sauveur 1999).

Expansion of Ugandan supply: opportunities and desirability

There seems to some scope for increasing supplies of Ugandan crude *Shea* oil to the international cosmetic ingredients markets. Current interest in extracting *Shea* oil in Uganda for this purpose suggests that the opportunity could be exploited and there are players in the market who are interested in direct investment. See page 57.

Constraints to expansion

- The market is very small. If Guru Nanak Oil Mills and Mukwano Industries decided to enter production, they would almost certainly swamp the current international market.
- The fragmentation of the market means that personal contact with buyers is indispensable. Buyers need to be reassured that they will receive quality products and service. To add to the difficulties, East African *Shea* butter is not as well-known as its West African counterpart.
- Market fragmentation will almost certainly diminish as the US market matures and the very high prices paid by a few buyers will disappear. However, the market will become more predictable and easier to sell into.

The market for cocoa butter equivalents

Cocoa butter gives chocolate its texture. It melts at body temperature and gives that familiar sensation in the mouth. However, despite recent low international prices, it remains one of the most expensive ingredients in chocolate. For many years, the confectionery industries in several countries have been using alternatives to reduce the quantity used. CBEs are the closest equivalents of cocoa butter, and not only reduce the manufacturing cost but can also modify the properties of chocolate and confectionery products to allow more versatile uses. Among CBEs, those manufactured from *Shea* butter are highly regarded.

The *Shea* butter CBE manufacturing process involves extracting triglyceride fractions that in combination have the same melting point as cocoa butter. The process is highly specialized and conducted by only a few companies in Europe and Japan. In Europe, Aarhus Olie in Denmark, Karlshamns in Sweden, and Unilever (Loders Croklaan) in Holland manufacture CBEs from *Shea* butter. In Japan, Fuji Oils are the major producers.

Secrecy within the CBE industry means that no precise figures exist for its *Shea* nut demand. However, sources in the industry suggest that Europe and Japan are importing between 50 000 and 70 000 t/*Shea* nut equivalent/year (Jaeger 1999); 50 000 t would yield approximately 20 000 t of *Shea* butter and 7000 t of *Shea* stearin, the hard fraction that contains the triglycerides of interest to the CBE industry. Trade volumes are probably increasing, due both to recent changes in EU legislation that has harmonized CBE usage in chocolate across the 15 member states and to a recovery in the traditionally strong CBE markets in Eastern Europe.

All *Shea* nuts and butter for CBEs currently come from West Africa, principally from Ghana, Burkina Faso, Mali, and Côte d'Ivoire. The further east one travels across Africa's

Shea belt, the softer *Shea* butter becomes. Given that CBE manufacturers are interested in the *Shea* hard fraction, the industry has paid no interest to *Shea* nuts produced in Uganda, the Sudan, and Kenya.

In the past, the major *Shea* butter CBE companies have preferred to import *Shea* nuts and conduct their own crushing, thereby ensuring that they are using the best quality ingredients in their manufacturing processes. However, environmental concerns in developed countries are beginning to force companies to rethink. Legislation in Japan and the EU is increasingly discriminating against the smells and effluents associated with oil seed crushing. Aarhus remains the only European company that continues to crush its own *Shea* nuts. Loders Croklaan has contracts with independent oil crushers in the UK, and within the last year, Karlshamns has sold its crushing mills. In Japan, Fuji Oils only import *Shea* butter, leaving the extraction process to companies in countries of origin.

Shea butter CBEs have to compete with CBEs produced from palm oil midfraction, illipe oil (from the nuts of the mahwa tree, found mainly in Indonesia and Malaysia), and sal fat (from the sal tree in India). Of these competing fats and oils, palm oil midfraction is dominant, and sal fat is generally regarded as inferior. Illipe oil has become all but unobtainable in recent years. The competitive position of *Shea* nuts and butter is therefore quite strong, and, at least for the time being, supply cannot keep pace with demand. Furthermore, *Shea* butter CBE manufacturers are unlikely to change their processes to suit other fats and oils because they have invested heavily in highly specialized processing technology for transforming *Shea* butter into CBEs.

Trade in *Shea* butter and nuts is not done through conventional commodity markets, in which thousands of transaction occur each day and futures and options markets provide mechanisms for risk management and price discovery. Too few buyers and sellers exist for such arrangements to have emerged. Trade is usually conducted through long-standing relationships among organizations that know and trust each other.

In summary, future demand for *Shea* butter as a CBE ingredient looks healthy. Changes to EU chocolate regulations, an improvement in demand for CBEs in both Eastern Europe and Japan, and the continued scarcity of illipe oil suggest that West African *Shea* nut and butter traders can expect to receive a growing number of export enquiries. Furthermore, tight environmental legislation in developed countries suggests that the *Shea* butter CBE manufacturers will increasingly wish to import *Shea* butter rather than *Shea* nuts.

Opportunities in Uganda

As has been already mentioned, Ugandan *Shea* nuts produce oil that is far too soft for the CBE industry. However, as part of our research, we tested the industry's interest in buying Ugandan *Shea* stearin (the hard fraction of *Shea* oil), a product that in theory should have properties similar to West African *Shea* butter. A local *Shea* processor provided us with a sample of his *Shea* "stearin" which we asked Loders Croklaan to analyze and comment on. Unfortunately, the reaction was entirely negative. The sample was "even softer" than unfractionated West African *Shea* butter and its "fatty acid profile does not suit [Loders Croklaan's] application at all".

The softness of the sample suggests that the local processing only partially fractionates the *Shea* oil. However, even if the oil were completely fractionated, the fatty acid profile would remain unsuitable. Clearly, it is unwise to base any conclusion on the results from a single sample but the long history of the CBE industry's indifference to East Africa *Shea* gives no room for optimism. Consequently we do not recommend donor support for Ugandan attempts to break into the CBE raw material market.

Case study

Small-scale oil mill, Northern Uganda

For twenty years, the owner ("Mr Jones") of the "Northern oil mill (NOM)" has made his career in oil and fat extraction, fractionation, refining, and further processing. As a chemical engineer with an MBA he is a respected member of the Ugandan oils and fats industry. Before establishing his own factory in Lira in 1996, he was working for a major oils and fats production company in Kampala.

His factory has two Indian-made expeller presses with a capacity of 15 t/oil/day. He currently processes cottonseed and sunflower oils. The products are sold on the local market in competition with oil from other large and small Ugandan manufacturers. NOM also processes its oil into liquid detergents, wood preservatives, and disinfectants.

Mr Jones's interest in *Shea* extraction grew when he discovered the high prices that US cosmetics manufacturers are willing to pay for *Shea* stearin. He built a pilot plant in his factory and experimented with extracting crude *Shea* oil and fractionating it into stearin and olein. Subsequently, he visited California and contacted several cosmetics manufacturers and raw material wholesalers. In the meantime, he has supplied small quantities of stearin to Ugandan cosmetics manufacturers.

His current plans involve devoting his factory to *Shea* extraction for at least half the year. Initially, he will purchase nuts from local wholesalers during the *Shea* season but ultimately his procurement requirements will force him to establish his own network for buying *Shea* nuts. The following financial analysis, Table 16, is based on a potential order of 240 t/*Shea* stearin/annum from the *Shea* Butter Company of Chicago, Illinois. NOM would supply this quantity in six months, while the rest of the yearly capacity would be devoted to crushing cottonseed and sunflower seed. The *Shea* olein by-product would be sold at competitive prices on the local cooking-oil market. On the basis of this financial projection, NOM would make a gross margin of 26.5%. This is a reasonably good return for a company of this type.

Although the analysis was conducted using fairly conservative assumptions, NOM would be vulnerable to changes in key parameters. In particular, if the cost of raw materials increased by 14%, the company's gross margin would drop to 16%. Similarly, if the price of stearin dropped by 10%, the gross margin would drop to 23%. On the brighter side, if Mr Jones's *Shea* nut buying operation can reduce raw materials costs by a realistic 14%, the gross margin would increase to over 37%.

Recent actions

In July 2001, Mr Jones purchased more than 5t of *Shea* nuts to produce 2 t of *Shea* butter. Small amounts of this butter are being sold into the local Kampala cosmetics industries. Mr Jones is advertising his *Shea* butter in the local newspapers, promoting his products.

Table 16. NOM analysis of *Shea* processing profitability.

	US\$/annum	% of costs
Operating costs—variable		
Raw material	428,571	82.5
Transport of stearin to Entebbe	5,486	1.1
Unskilled labor	1,440	0.3
Subtotal variable operating costs	435,497	83.8
Operating costs—fixed		
Management	15,000	2.9
Technical personnel	6,000	1.2
Electricity, medical, motor, office	2,057	0.4
Routine maintenance	10,000	1.9
Subtotal fixed operating costs	33,057	6.4
Subtotal operating costs	468,554	90.2
Contingency (5%)	23,428	4.5
Total operating costs	491,982	94.7
Capital costs	27,500	5.3
Total annual costs	519,482	100.0
Annual revenue	592,653	
Profit (loss) before tax	73,171	

Constraints

- Although several cosmetics companies in the US have expressed interest in buying Mr Jones's *Shea* stearin, they are not willing to pay the costs of importation. The *Shea* Butter Company is an exception, but is willing to offer only a very low price (US\$1 fob Entebbe). Mr Jones lacks the necessary linkages to get his product to the US and European markets. Since airfreight would add approximately US\$3/kg, this approach, given sufficient quantities and no rancidity, might warrant consideration of sea freight in 20-foot containers.
- The international *Shea* product cosmetics market is small and may limit the expansion of Mr Jones's business.
- The cosmetics industry in Uganda is unfamiliar with *Shea* stearin and will require considerable persuasion to buy bulk consignments of this product. Although, they have purchased small lots, the companies have indicated that they require more information on product usage and incorporation into creams and lotions.
- Mr Jones's entry into the much larger international food ingredients markets will be barred by a poor perception of Ugandan *Shea* oil, or he will not be able to compete on this market due to the more competitive prices in West Africa and the closer markets.
- Finding the required volume of *Shea* nuts (2140 t) will probably not be a problem but if supplies are not properly dried and contain a large proportion of poor quality nuts, Mr Jones's raw material costs will rise substantially. Estimates of the proportion of nuts offered for sale that are of unprocessable quality range from 10 to 15%.

- On the basis of our analysis, during Mr Jones's six months of *Shea* processing, he will require US\$185 000 of working capital. Without making too many assumptions about Mr Jones's finances, he might find difficulty in raising this sum. See Annex 4.
- NOM would be unable to dispose of the large quantities of *Shea* nut cake (1290 t) that would be produced as a by-product of the crushing process. Mr Jones claims that the cake could be used as a fertilizer that also has insecticidal properties. Realizing even a modest income per tonne of cake would increase NOM's profitability substantially.

Mr Jones may go ahead with his plans regardless of donors' intervention. However, his business is not so big that he is likely to ignore donor assistance if it was offered. The interventions made in the recommendations would simultaneously assist Mr Jones and protect the interests of poor northern Ugandans.

Main findings and conclusions from the survey

Importance of *Shea* in Uganda

1. The survey confirmed that *Shea* is a major source of income for the communities in the main *Shea* producing districts of Uganda. Within the local market, *Shea* trees are highly valued for a range of products including cooking-oil, local creams, fruit pulp, bark, roots, leaves, wood, and charcoal.
2. In terms of gender, *Shea* is a crop that is almost exclusively the domain of women. The crop is gathered by women and children, the crop is processed by women, and most of it is sold by women. *Shea* is enshrined in the domestic culture of women and is used as source of fruit, oil, Vaseline, and medicine. Men are mainly involved in wholesaling and storage of *Shea* nuts.
3. Results from the surveys found that for women involved in *Shea* nut and oil sales, this commercial activity was likely to be the most lucrative commercial activity of their financial year. Therefore, any increase in demand for *Shea* nuts or oil would have a considerable positive economic impact on their livelihoods.
4. For dietary and food security importance, *Shea* is highly prized as a fruit during the lean season. It is an important source of vitamins. For most of the villages in the northern districts, *Shea* is the only source of cooking-oil.

Environmental and research status of *Shea* in Uganda

5. Previous USAID investment in the *Shea* sector has significantly raised the value placed upon *Shea* in the production zone. *Shea* awareness campaigns have developed a strong community spirit towards protecting *Shea* trees and preventing the exploitation of *Shea* for charcoal burning. This need to protect *Shea* trees has been effectively absorbed by the people in the production zone and there are reports that spillover effects of the COVOL project message have also affected areas across Uganda and into the *Shea* producing districts of Sudan.
6. The COVOL project, working in collaboration with the EU-funded INCO project, has developed a strong team of *Shea* researchers and significant progress has been made in the understanding of the *Shea* crop. Much of this information was captured in the proceedings of a regional *Shea* Tree Workshop held in Lira, 2000. The proceedings remain unpublished and efforts should be made to facilitate the publication of this valuable text.

World trade in *Shea*

7. In West Africa, marketing channels are well defined and there has been a long-standing export of *Shea* nuts and butter to European countries and North America. The primary export market for the West African *Shea* butter is as a substitute for cocoa

butter in the chocolate and confectionery industry. There have been some attempts to market local cosmetic products such as “Vaseline *Shea* Butter”. Although the product was commercially successful, problems with sourcing *Shea* butter forced a manufacturer in Ghana to cease production. The product has not been relaunched.

8. International market demand for *Shea*-based products is increasing due to three factors. Changes in EU regulations now make it possible to blend up to 5% CBE into chocolate products. Economic recovery in former Soviet states has led to increased demand for *Shea* for input into their confectionery products. There has been renewed interest in *Shea* butter for cosmetics.
9. Chemical analysis of *Shea* butter extracts indicates that Ugandan *Shea* has similarities with olive oil and that this offers two potential markets, in cosmetics and cooking-oil production.

Supply of *Shea* across the savanna belt

10. According to FAO, the potential production of *Shea* in Africa is approximately 1 760 000 t of *Shea* nuts. Only 35% of these nuts are gathered and 85% of this harvest is locally processed, to make 100 000 t of local butter. Approximately 65 000 t are exported, mostly to the food industry, and it is estimated that 3000 t/year are used by the international cosmetics industry.
11. Potential *Shea* nut production in the Ugandan *Shea* belt is estimated to fall within a range from 70 000 to 385 000 million t, with a high variation in annual yield. This would yield between 15 and 80 million liters of oil using traditional methods, which would have a median value of US\$30 million. Extraction may increase up to more than 120 million liters with improved processing techniques.
12. From interviews and market visits, it was estimated that the total volume of *Shea* nut transactions through the northern Ugandan markets is approximately 6000 t/year. However, many of these transactions are connected with interseasonal storage of nuts and, therefore, we estimate the actual volume of nuts to be 3000–4000 t. This volume equates to approximately 700 t of oil, or 0.8 million liters of oil. Given that the wholesale value of *Shea* oil is approximately Ush 1500/liter, this translates to a market value of Ush 1 186 500 000, which is equivalent to US\$ 0.68 million (US\$1 = Ush 1750).
- 13 The current trade in *Shea* nuts accounts for approximately 4–5% of the oil produced from local vegetable oils in Uganda. This figure does not take into account the amount of oil that is locally produced and does not enter the market place. Further studies would be required to determine this level.

Implications for Ugandan marketing based on the Ghanaian marketing system

14. The quality of *Shea* butter is highly dependent upon the methods of grading nuts, drying, and processing. Gatherers and processors should find effective working relationships in order to maintain quality along the value chain.

15. Production of commercial *Shea* butter can be achieved using a range of technologies, however, scale of output must be matched with market requirements. Cosmetics buyers require small quantities but pay high prices, whereas CBE buyers require large quantities but pay relatively low prices.
16. Personal contact with overseas buyers, whether for the CBE or cosmetics market, is indispensable. In West Africa, commercial links with overseas industries are well established and similar contacts need to be established in East Africa if development of the *Shea* subsector is to develop in a sustainable manner.
17. In Ghana, the experience of producing a mass-market skin-moisturizing product containing *Shea* butter points to the potential of exploiting regional cosmetics markets. East Africa's large-scale cosmetics industry is well established and has the capacity to develop new products. The Vaseline-type product is something that has not been investigated in Eastern Africa. Large amounts of Vaseline are retailed in shops throughout the region so this may be a market with considerable potential.

Current market status of *Shea* in Uganda

18. The COVOL project in association with NUSPA has made significant progress over the past five years. The most important achievements include the following. NUSPA was organized into a *Shea* nut gathering network with more than 200 farmers across all the *Shea* producing districts of Uganda. These members meet on a regular basis and, most importantly, are able to grade nuts according to quality. A number of women's groups have been trained in high quality processing of *Shea* butter and improved *Shea* processing equipment has been deployed to the local community. A range of improved *Shea* products has been developed including local cooking-oil, hot roasted and cold-pressed, export quality hand and body lotions, lip balm, and some novel pet products.
19. Within the marketing strategy, COVOL was to play a market linkage role for NUSPA, the local processors, and cosmetics retailers such as Body Time. Although this strategy seems to be sound, in terms of (1) local equity for the processors, (2) the establishment of an intermediary that handles quality and market linkage, and (3) a strong retail partner in USA, the volumes of sales through this system were low. The costing structure was somewhat unclear and sales performance was poor, possibly due to problems at the retail end of the marketing strategy. Future trade via the COVOL link is unsure at this time, but events can be tracked on their website.

Prospects for market expansion

20. There are considerable seasonal fluctuations in market prices for *Shea* nuts. Expansion of interseasonal storage would help to reduce the large seasonal price movements. It would also create greater demand for nuts in the *Shea* season, increase household income during this period, and help to reduce household expenditure later in the year when *Shea* nuts have to be purchased. The overall effect would be an improvement in household food security and less income drain in the off season period.

21. Prospects for expanding the *Shea* olein market would mean moving from very small and irregular production to substantial tonnages. There is an opportunity to supply a competitively priced *Shea* olein product to the expanding cooking-oils market, as a by-product of *Shea* stearin export production. As the chemical profile of Ugandan *Shea* olein is most comparable with that of olive oil, high-quality *Shea* olein could be sold as a highly competitive product (bearing in mind that price, and not quality, is the main market driver). Sales of crude *Shea* oil on national and possibly regional markets depend crucially on consumer preferences and how cleverly the product can be marketed.
22. Surveys in the local cosmetics markets found there was considerable interest in developing value-added *Shea* cosmetic products for a domestic market of expatriates and upscale Ugandan women. Most respondents had never heard of *Shea* before, but all respondents reacted very favorably towards it when told of the benefits. Women would be interested in buying lip balm, body lotion, hand cream, and soaps. There was a perception from the group that a “butter” was not a product to use as a facial cream and therefore the term “*Shea* butter” does not lend itself well to face cream. The major challenge that local manufacturers of *Shea* products need to address is the smell. It will be important to create a pleasant-smelling product while still retaining the natural positioning and the product benefits. Quality packaging is also essential and a high profile, well-targeted marketing campaign will be necessary to communicate the emotional and physical product benefits.
23. With regards to a market in Northern Uganda for improved *Shea* cooking-oil, the response was very positive, but the reality of limited income and the spending habits of the women in Lira does not lend itself to a rapidly growing market. Further analysis of this would be required with samples of high-quality olein to pursue this possibility.
24. The main international cosmetics buyers of *Shea* butter/oil are located in Europe and the US. A large proportion of *Shea* butter is purchased from the food industry in a highly refined form. Such butter is cheap, having usually been obtained through solvent extraction, readily available, reliable in quality, and does not become rancid. However, solvent extraction removes most of the sun-protection, healing, and antiseptic qualities of the natural butter. Therefore, *Shea* is used mainly to improve the labelling, rather than for its health-providing qualities. Smaller companies and specialist suppliers of cosmetics ingredients are willing to buy unrefined *Shea* butter from Africa. However, concerns over quality have forced them to become intimately involved with its production. Linking groups from Uganda with specialist cosmetics companies will require a considerable amount of market support, either in terms of direct market linkage with the cosmetics company or through an intermediary organization in Uganda.

Potential agents for developing the *Shea* market in Uganda

25. COVOL is currently the only *Shea* processor in Uganda that is producing higher-value products on a regular basis. The organization has developed a supply chain and has deployed low technology processing equipment in the *Shea* producing villages, so that

local community groups can process a high quality product. The organization suffers from relatively high overhead costs and lacks capital from which to expand the business. COVOL developed a marketing model that is closely aligned with the “ethical trade” movement in terms of maximizing the involvement of and rewards to the local community. The organization has been successful in developing products and identifying buyers but sales volumes have been disappointing. The marketing system may benefit considerably if a small-business advisor, such as Technoserve, were to work with NUSPA and COVOL to develop a more robust business plan. The decentralized community-based processing model developed by COVOL is unique and is highly attractive in terms of local ownership and the retention of a higher portion of the added value in the rural areas. Although COVOL are not at this time keen to centralize their processing activities, it may be that a critical financial review and quality assessment would indicate the advantages of a more centralized processing center. During the visits to Lira, it was the view of several operators in the oil milling business that significant savings and quality improvements could be achieved if NUSPA supplied a more technically advanced organization to process the product at a single processing center where hygiene could be closely monitored.

26. “Mr Jones of NOM”, Lira, has built a pilot *Shea* extraction plant and is experimenting with extracting crude *Shea* oil and fractionating it into stearin and olein. He has supplied small quantities of stearin to Ugandan cosmetics manufacturers and has already started processing *Shea* butter in the hope that he will find a buyer. Although there is a possibility that he may attract some local interest, the Ugandan cosmetics firms at present are not familiar with *Shea* and do not know how to formulate *Shea* in their products. In order to develop either a local or export market, he requires support in terms of technical analysis of the products he is currently processing to determine their potential for export. To develop the domestic market, the cosmetics manufacturers would also require technical support in how to utilize *Shea* in their formulation ranges.
27. Mr Alykhan Karmali, MD, Mukwano Industries, the largest vegetable oil processors in Uganda, is considering the development of a *Shea* extraction plant that would process up to 2000 t/year of oil, based on the purchase of some 5000 t of nuts. The stearin would be used through an in-house cosmetics company and the olein would either be mixed into the sunflower oil or sold as a stand-alone product. At worst, the oil would be used in the soap-making process. An alternative market strategy would be for Mukwano to produce and sell the *Shea* stearin to generic cosmetics companies that make products for the major retail stores in Europe.
28. Other potential players may include the recently established Nile Products Trading Company. Technoserve is providing the technical support for this new marketing initiative and the current consultant, Mr A. Gasparotti, was previously involved in the exportation of *Shea* products from West Africa to the Japanese cosmetics market. Regional cosmetics producers, for instance, Unilever in Nairobi, should also be explored as potential buyers; samples of Mr Jones’ *shea* stearin were sent to Unilever for tests.

market-driven products. If a budget was dedicated to product development and processing, a budget will also have to be dedicated to market development. Without this, *Shea* products will continue to reside in obscurity. Products that could be developed are soaps, body lotion, lip balm, and solid hair oil. Key elements to the strategy will be (1) developing locally produced and packaged value-added *Shea* products that meet the criteria of a discerning market, and (2) the need for a substantial marketing budget.

5. Market linkage for export and domestic products

Given that Ugandan *Shea* is more suited to cosmetics, interested private sector partners need to be connected from (1) producers/gatherers, (2) local primary processors (first stage oil extraction and fractionation), (3) secondary processors (those that formulate cosmetics products), and (4) retailers. The most important of these players, the retailers/secondary processors, i.e., those involved with buying cosmetics ingredients from Europe, USA, and the Middle East, need to be identified, informed of prospects, and if interested, invited to Uganda to meet potential primary *Shea* producers. A study on *Shea* users in the international cosmetics industry is available. This list of buyers requires updating to assess buyers' interest.

6. Secondary processors/retailers

When potential buyers have been identified, it would be possible to develop meetings between these agents and the potential primary processors in Uganda. This process of vetting potential buyers and linking them to processors could be accomplished through an agency such as the Investment in Developing Export Agriculture Program (IDEA).

7. Equitable trade partnerships

The *Shea* product is a non-plantation crop that is produced organically and harvested by local communities. It has a potential marketing package that could be linked to alternative trading arrangements, such as the Fair Trade movement and community-based buying (as operated by, among others, the Body Shop). Organizations such as Trade Craft would be able to use their current contacts within the equitable trade fora to access the best supply and marketing models to develop the grades that are required for the products. They could also evaluate the demand in terms of volume and the equity terms along the value chain. A critical part in this study will be to assess the real comparative advantage of Ugandan high-value stearin, compared with more established products and marketing agents for *Shea* products in Western Africa.

8. Primary processors

A planning workshop is needed with the main players in Uganda that are interested to develop the *Shea* sector. This could be done through Technoserve, who would be able to assist in business plan development and, crucially, to provide an overview of the most credible business plans that were developed. In return for donor assistance, *Shea*

nut processors could be expected to enter an ethical trade agreement, whereby they would pay a “fair” price to nut gatherers (possibly through a pricing formula). Terms for such an arrangement would be defined in the terms of reference (TOR) developed by the equitable trade survey.

9. Gatherers

An important component for the local community is the development of organized *Shea* nut gatherers and training groups to supply high quality nuts. This aspect would take place only when markets have been identified, i.e., when there is an investor and a buyer lined up. Given that this has been established, donor assistance could be effectively used to strengthen the *Shea* buying network. NUSPA has the ability to supply large quantities of high quality, dry *Shea* kernels. During our fieldwork, the NUSPA chairperson estimated that her members could gather 1000 t in a *Shea* season. In return for access to this valuable supply network, a primary processor could be asked to enter into an “ethical trade” agreement with NUSPA to pay a fair price for the *Shea* nuts.

10. Marketing of traditional *Shea* products.

To improve the current processing and trade in traditional products, womens groups within the *Shea* belt of Uganda could be trained in the following areas.

Methods of Shea storage, i.e., investigate the potential for training women’s groups in storage techniques and how to manage credit in order to play a role in wholesaling the nuts.

Market information, i.e., train women’s groups in the use of market information to evaluate the benefits of storage during the peak season.

Improved processing, i.e., train women’s groups in improved methods for processing *Shea* and about the benefits of *Shea* in the diet. All processing ideas would need to be developed on a cost sharing basis from the outset such that the groups would be clear that any development within the traditional sector would be through a commercial, partnership style arrangement.

Oil milling, i.e., investigate the prospects of assisting the development of a medium-scale oil milling business to improve the quality and throughput of *Shea* olein production, such that the oil can compete on a better price basis with refined oils.

11. By-products.

Commission research to evaluate the fertilizing, insecticidal, and sterilization performance of ground *Shea* expeller cake.

Future strategies

There are three main strategies that can be adopted by USAID in the *Shea* sector at this time.

1. Withdraw support from the *Shea* sector in Uganda

As a result of this action, new commercial players may enter the business and bring changes to the subsector. USAID would be able to do very little to influence matters and the consequences of this action might mean that capacity built on investment to date would be lost. Those most negatively affected by the withdrawal of support will be the members of NUSPA who have developed skills in *Shea* bulking and processing and have developed a strong loyalty to *Shea*, based on their financial returns to date.

2. Continue support to conservation-biased *Shea* projects

This approach will build on the success so far achieved with regard to *Shea* in northern Uganda and the conservation of the *Shea* habitat. Whilst this approach will meet parts of the USAID strategy, it is unlikely to address the underlying economic problems that will lead to sustainable conservation, particularly in the northern part of Uganda which is particularly challenged economically. Therefore, any conservation-biased approach should also consider marketing strategies and returns on investment as an integral part of any development process.

3. Enhance support to the commercialization of *Shea* products

As this survey suggests, further support to the commercialization of the Ugandan *Shea* sector should focus on developing the cosmetics markets, including the national, regional, and international markets. To do this, strategies should include the following.

Developing business plans

Assisting the potential *Shea* processors, identified in this study, to develop robust business plans would enable donors and banks to make more informed decisions on where to make future investments for most effective economic and employment benefits to this economically challenged area of Uganda.

Enhancing market linkage

A key finding from this study was the lack of linkage between *Shea* processors in Uganda and processors or cosmetics houses in the target markets. Developing stronger links with buyers would require further market investigations to gauge the interest of buyers in the region, Europe, and USA for Ugandan *Shea*. Market interest could be evaluated

by agencies such as IDEA. Prospects or leads could be further stimulated by bringing potential buyers to meet suppliers in Uganda.

Supporting access to venture capital

Having developed business plans and made links with buyers, USAID would be in a strong position to design programs that would offer venture capital and/or grants to private sector partners, in order for them to implement business ventures to penetrate the *Shea* cosmetics markets. Given this scenario, USAID would be in an ideal position to influence environmental and social responsibility such as ethical trading links, for any future developments in this sector. This strategy is based on the assumption that investment would be closely tied to the private sector's ability to take the lead in developing business plans, showing intent for investment, and securing purchase contracts with identified investment partners.

References

- Bekure, Z., M. Donlan, Y. Gordon and J. Thomson. 1997. Local to global: the international market for *Shea* butter. Presented to United Nations Development Fund for Women (UNIFEM) April 1997. Applied workshop in International Development. Columbia team report. 49 pp.
- Boffa, J-M., G. Yaméogo, P. Nikiéma and D.M. Knudson. 1999. *Shea* nut (*Vitellaria paradoxa*) production and collection in agroforestry parklands of Burkina Faso in Domestication and commercialization of nontimber forest products in agroforestry systems, edited by R.R.B. Leakey and A-M.N. Izac. Non-wood Forest Products 9. FAO, Viale delle Terme di Caracalla, Rome, Italy.
- Chalfin, B. 1996. Market reforms and the State: the case of *Shea* in Ghana. The Journal of Modern African Studies 34: 3–8.
- Collinson, C. 1999. International market analysis for *Shea* butter. Report No. 2403. Natural Resources Institute, Chatham, UK.
- Collinson, C. and S. Zewdie-Bosuener. 1999. *Shea* marketing in West Africa. Natural Resources Institute, Chatham, UK.
- Covol Uganda. 1992. *Shea* in Uganda. A preliminary report submitted to USAID, Uganda Office. Unpublished. 16 pp.
- Covol Uganda. 1994. The *Shea* project for local conservation and development. An interim report submitted to USAID, Uganda Office. Unpublished. 54 pp.
- De Saint Sauveur, A. 1999. The *Shea* project: an economic assessment. Profitability of improved *Shea* butter processing, potential new market, and products. PROPAGE, Montpellier, France.
- Devey, M. 1995. Le karité: un arbre originaire d'Afrique, des marchés qui se diversifient. Marchés Tropicaux 1471.
- Donkor, P. 1999. Testing of *Shea* butter equipment, UST, Kumasi, Ghana.
- Fleury, J.M. 1981. The butter tree. International Development Centre Reports 10: 6–9.
- Gallat, S. and C. Collinson. 2000. The economic viability of small-scale butter processing in Northern Ghana. NRI Report, No. 2521. Natural Resources Institute, Chatham, UK.
- Hall, J.B., D.P. Aebischer, H.F. Tomlinson, E. Osei-Amaning and J.R. Hindle. 1998. *Vitellaria paradoxa*: a monograph. School of Agricultural and Forest Sciences Publications No. 8. University of Wales, Bangor, UK. 105 pp. Reprinted in 1998 with minor corrections.
- Hall, J.B. and J.R. Hindle 1995. Epitypification of *Vitellaria paradoxa* c.f. Gaertn. (Sapotaceae). Taxon. 44: 409–410.
- Hepper, F.N. 1962. Nomina conservanda proposita. *Butyrospermum* Kotschy against *Vitellaria* Gaertn. F. (Sapotaceae). Taxon. 11: 226–227.

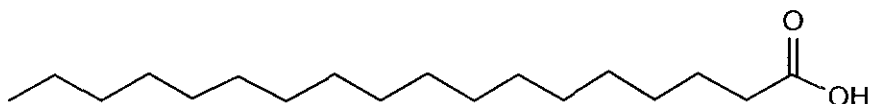
- Jaeger, P.-M. 1999. The global market for *Shea* nut and *Shea* nut butter. Unpublished report prepared for TechnoServe by Accord Associates, Dorset, UK.
- Kisakye, J., A. Vanderheiden, Y. Moyini, S. Fine, C. Murphy and P. Tibasiimwa. 1997. A final evaluation of the *Shea* Project (a pilot phase). Cooperative agreement No. 623-01240A-OO-5113-00. USAID, Uganda Office document. 47 pp.
- Maranz, S. and Z. Wiesman. 2000. Resource potential of *Vitellaria paradoxa*: characterizing populations and building a database in *The Shea Tree (Vitellaria paradoxa* subsp. *nilotica*) edited by P.N.C. Lovett and E.T. Masters. Proceedings of the first regional conference for Eastern and Central Africa, Lira Hotel, Uganda, 26–30 June 2000. Unpublished.
- Masters, E.T. 2000. The *Shea* Tree (*Vitellaria paradoxa* subsp. *nilotica*). Proceedings from the first regional conference for Eastern and Central Africa, Lira Hotel, Uganda, 26–30 June 2000. Unpublished.
- Masters, E.T. and A. Puga. 2000. Production and marketing of *Shea* products from Northern Uganda in *The Shea Tree (Vitellaria paradoxa* subsp. *nilotica*): Proceedings from the first regional conference for Eastern and Central Africa, Lira Hotel, Uganda, 26–30 June 2000. Unpublished.
- Nkuutu, D., P.N.C. Lovett, E.T. Masters, P. Ojok and J. Obua. 2000. The management and plant utilization in the agroforestry parklands of northern Uganda in *The Shea Tree (Vitellaria paradoxa* subsp. *nilotica*) edited by P.N.C. Lovett and E.T. Masters. Proceedings of the first regional conference for Eastern and Central Africa, Lira Hotel, 26–30 June 2000. Unpublished.
- Obi, I. 2000. Potentiels et perspectives du karité et de ses sous-produits sur les marchés local, national, régional et d'exportation. Haite Ecole Suisse d'Agronomie, Section Agronomie Internationale, Zollikofen, Suisse.
- Otimodoch, P. and S. Singh. 2000. A study to establish oil milling capacity in Uganda. Vegetable oil development project, Ministry of Agriculture, Animal Industries, and Fisheries. Report submitted to USAID Uganda, as part of a national oil mills survey. Unpublished.
- Robbins, P. 1995. Tropical commodities and their markets: a guide and directory. TWIN, Kogan Page Ltd, London UK. ISBN 0-7494-1627-0.
- Ruyssen, B. 1957. Le karité au Soudan. *Agronomie Tropicale* 12: 172,279–306, 415–440.
- Schreckenberg, K. 1996. Forests, fields, and markets: a study of indigenous tree products in the woody savannas of the Bassila region, Bénin. PhD thesis, University of London, UK.

Annex 1

Stearic acid and Sodium stearate

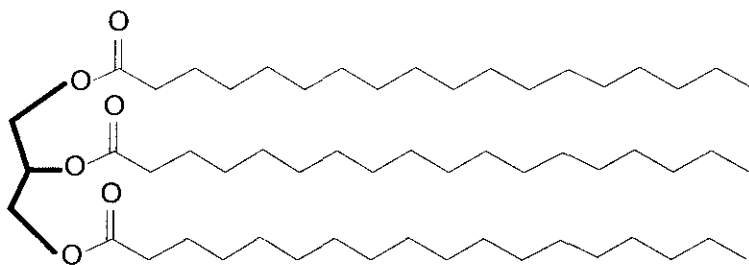
Stearic acid is a typical example of a fatty acid, which are essentially long hydrocarbon chains containing a carboxyl group at one end and a methyl group at the other. The chain lengths can vary from 3 (propionic acid) to 24 (lignoceric acid) but the majority of fatty acids found in hydrogenated vegetable or animal oils are around C_{16} – C_{20} in length. Stearic acid is a *saturated* acid since there are no double bonds between neighboring carbon atoms. This means that the hydrocarbon chain is flexible and can roll up into a ball or stretch out into a long zigzag.

It is made by extraction from tallow, which is the mixture of fats that is obtained by



Stearic acid

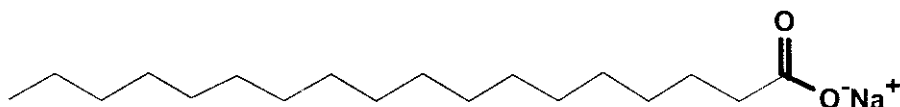
steam treating cow fat. Tallow contains tristearin (which is just 3 stearic acid molecules joined to one glycerol molecule, shown in **bold** in the figure), which, after heating with sodium hydroxide yields sodium stearate.



tristearin

Sodium stearate—soap

Sodium stearate is a typical example of a detergent or soap since it contains a long hydrocarbon “tail” and a carboxylic acid “head” group (**bold**).



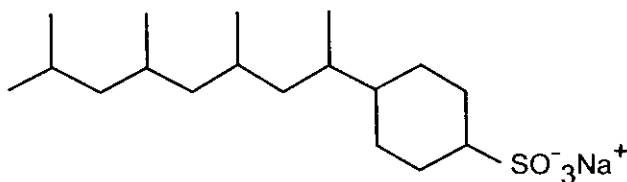
Sodium stearate

The molecule gets over the problem that “oil and water don’t mix” by having a molecule with 2 parts, an oily part and an ionic part. The tail is basically an alkane, and so readily dissolves in fat, oil and grease but *not* in water. Thus the tail is said to be *hydrophobic* (= water hating). The head group, however, is polar, and so easily dissolves in water (*hydrophilic* = water loving) and will not dissolve in oil or grease. Thus, when added to water containing dirt, oil, or fat droplets (e.g., when doing the washing up, at bathtime, or the laundry, etc.), the tail avoids contact with the water by burying itself into the oil droplets, leaving the head groups sticking out into the water, as they prefer. Thus the oil and dirt are dragged off the dirty objects (dishes, clothes, or people) collected together into clumps, and washed down the drain.

Sodium stearate is not the only fatty acid to be used in soaps. Sodium laurate (the salt of lauric acid which is a C_{11} fatty acid extracted from coconut oil) is often added. Potassium salts of fatty acids are also used, in combination with excess stearic acid, to give a slow-drying lather for shaving soap.

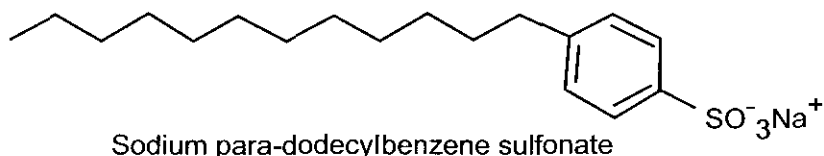
Biodegradability

Natural bacteria can metabolize soaps, and this process is most rapid when there are no branches in the hydrocarbon tail of the soap molecule. Since the naturally occurring fatty acids are all straight-chained, soaps derived from natural fats (like sodium stearate and laurate) are *biodegradable*. However, in 1933 the first synthetic detergents were marketed, with the advantage that they did not form the hard “scum” that often results when soap is used in hard water regions. (This scum is actually the insoluble calcium and magnesium salts of the fatty acid, e.g., calcium stearate.) The first detergents were alkylbenzenesulfonates: like soaps they had a polar head and a large hydrocarbon tail, but the tail was branched.



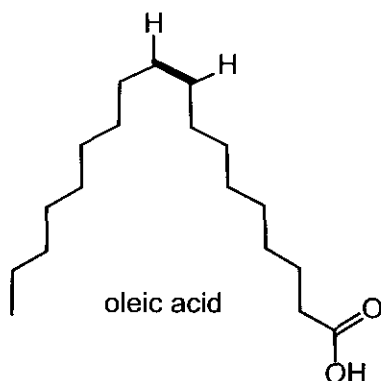
Sodium alkylbenzene sulphonate

That meant that these early detergents were not easily biodegradable, and since the bacteria which operated in sewage plants could not metabolize them they were passed into the waterways with the treated sewage, often appearing as unsightly foam or suds on the surface of lakes and rivers. Faced with this problem, in 1965 the detergent industry introduced linear alkanesulfonate detergents (such as the one shown in the figure), which, being straight-chained compounds, were biodegradable.



Oleic acid

Oleic acid (also called *cis*-9-octadecenoic acid) is an example of a fatty acid found in animal and vegetable oils. It is a *mono-unsaturated* fatty acid, due to the presence of a single double bond. The physical properties of fatty acids like oleic acid are determined by the number, geometry, and position of the double bonds in the chain, along with the degree of unsaturation (i.e., number of double bonds). In naturally occurring fatty acids such as those found in vegetable oils, the double bonds are all in the *cis* configuration (shown in **bold** in the figure), making the molecules bent or curved. This also makes the molecules much less flexible than those of fully saturated fatty acids (e.g., stearic acid). Their bent shape also hinders crystallization, and explains why these acids are oils at room temperature. (Saturated acids have straight chains and can pack easily into a crystal lattice, and so are solid at room temperature, e.g., butter.)



Unsaturated fatty acids are a good energy reserve, and are found in abundance in many types of meat. Pork, lamb, and chicken fats all contain a higher proportion of unsaturated fats than beef and so feel softer to the touch. Plant seeds, too, are a good source of these fats, where they act as a compact efficient food reserve. They can be found in plants as diverse as corn, cottonseed, soybean, rapeseed, safflower, and sunflower. Oleic acid itself is the main fatty acid in oil pressed from the ripe fruit of the olive (*Olea europaea*). It was also featured

in the Hollywood film *Lorenzo's Oil* (Universal Studios 1992). In a rare genetic illness called adrenoleukodystrophy (ALD), young boys suffer from an excess of harmful long chain (C_{24} – C_{26}) fatty acids which causes the myelin around nerves cells to deteriorate, leading to brain damage. The boys progressively lose more of their faculties, speech, movement, etc., until they eventually die. It was discovered that ingestion of large quantities of pure oleic acid triglyceride (mixed with around 25% of the related C_{22} acid, erucic acid) prevented the buildup of the harmful longer chained acids, relieved all the symptoms associated with the disease, and allowed the sufferers to lead a normal life. This works by essentially keeping the enzyme responsible for biosynthesis of the acids busy metabolizing these harmless acids, and so they have no resources left to produce the harmful ones.

Oleic acid is present in the cocoa butter of chocolate as one component of a triglyceride. The other two components are often either stearic acid, or the closely related palmitic acid. This means that the triglyceride has a much more uniform structure than is normally found in most fats and oils, and this uniformity results in a sharper than normal melting point. This allows chocolate to remain stiff almost up to its melting point (34°C). When it does melt, the melting occurs suddenly and endothermically. If this occurs in the mouth, it gives a feeling of coolness—this is perhaps one of the reasons for the lasting popularity of chocolate (along with its sweetness due to the added sugar).

Annex 2

Shea nut production

FAO's production and export statistics of major supplying countries are provided in below, although they are not considered to be completely accurate and are primarily estimates.

Exports during the last two years of available statistics hovered around 50 000 t with an export value of US\$10 million. Exports in 1996 and 1997 were more than double the five-year low recorded in 1993, but lower than the high recorded in 1994.

Table 1. *Shea nut production, 1993–1998 (t).*

	1994	1995	1996	1997	1998
Bénin	15,500	15,000	15,000	15,000	15,000
Burkina Faso	70,100	75,700	70,000	70,000	70,000
Côte d'Ivoire	19,785	20,000	20,000	20,000	20,000
Ghana	57,000	56,000	55,000	55,000	55,000
Mali	85,000	85,000	85,000	85,000	85,000
Nigeria	353,000	384,000	345,000	355,000	355,000
TOTAL	607,385	644,220	592,504	606,500	606,500

Source: FAOSTAT.

Table 2. *Worldwide Shea nut exports by volume 1993–1997 (t).*

HS Code 120792	1993	1994	1995	1996	1997
Ghana	1,793	13,988	6,000	19,654	19,654
Bénin	7,870	15,266	9,504	9,504	9,504
Côte d'Ivoire	4,792	12,163	11,195	5,422	5,422
Burkina Faso	5,000	5,000	7,633	7,633	7,633
Togo	1,112	6,562	4,606	8,330	5,284
Nigeria	–	5,000	–	–	–
Mali	500	500	500	500	500
UK	–	215	182	28	–
Other	28	10	34	21	31
TOTAL	21,095	58,704	39,654	51,092	48,028

Source: FAOSTAT.

Table 3. Worldwide *Shea* nut exports by value 1993–1997 (US\$000s).

HS Code 120792	1993	1994	1995	1996	1997
Ghana	340	2,590	1,500	5,846	5,846
Bénin	1,071	2,223	1,400	1,400	1,400
Côte d'Ivoire	1,319	1,601	1,973	793	793
Togo	137	764	788	1,274	972
Burkina Faso	500	500	847	847	847
Nigeria	–	1,500	–	–	–
Mali	150	150	150	150	150
UK	–	45	37	9	–
Other	6	9	38	10	33
TOTAL	3,523	9,382	6,733	10,329	10,041

Source: FAOSTAT.

Historically, the price for cocoa butter has reached a high of US\$1000/t, but there has been a gradual downward trend as the price of cocoa beans and butter has decreased. The price of *Shea* nuts and butter follows the movement in the price of cocoa beans and butter but at a substantially lower price because it is only a substitute for cocoa butter in chocolate. The price of cocoa beans has decreased 40% in the past year due to increased supply at origin and lower consumption in the market (Figs. 1–3).

Manufacturers add the *Shea* butter to their CBE in the hope that they can provide a discount on their product in order to increase sales, although they often try to convince

**Figure 1. CSCE cocoa futures (US\$/t), May 1998–June 1999.**

Show data point



Figure 2. CSCE cocoa futures (US\$/t), Dec 2001–Nov 2002.

Show data point



Figure 3. Cocoa butter, African type (US\$/t), May 1998–June 1999.

Source: Public Ledger Online.

consumers that there is a quality issue involved in their marketing decision. With lower cocoa bean prices, there has been less of an incentive to purchase *Shea* nuts. Chocolate manufacturers remain committed to CBE, nevertheless, because their thinking is long-term and the confectionery industry has a labeling cost to contend with in Europe as they must state whether a product has CBE in it or not.

There is a large markup for the various *Shea* nut by-products: fractionated oil can fetch a price of US\$3300/t and the refined butter from Europe trades at US\$1000/t (all prices cif, US). The retail price for the refined butter is US\$6/ounce in the US. The unrefined *Vitellaria nilotica* *Shea* butter from Uganda is priced at US\$60/kg, while unrefined *Shea* butter from West Africa is priced at US200/t (cif, Europe).

Annex 3

Importers

Loders-Croklaan

Hogeweg 1

PO Box 41520 AA

Wormerveer THE NETHERLANDS

Tel. +31-75-6292911

Fax +31-75-6292421

Contact: Mr Japp Biersteker

WWW: <http://www.croklaan.com>

(This office is a subsidiary of Unilever UK Plc and does all its tropical nut and edible oil buying.)

Karlshamns AB

37482 Karlshamn SWEDEN

Tel. +46-454-82000

Fax +46-454-82839

Contact: Ms Monika Hjorth

email: mh@karlshamns.se

Aarhus Oliefabrik A/S

M.P. Bruuns Gade 27

PO Box 50 DK-8000 Aarhus C DENMARK

Tel. +45 8730 6000

Contact: Mr Soeren Laursen

email: sla@aarhus.com

Britannia Food Ingredients Ltd

Goole DN14 6ES UK

Tel. +44-1405-767776

Fax +44-1405-765111

Contact: Mr Phil Nash

email: office@britfood.demon.co.uk

(Raw material supplier to Mars and Cadburys, UK.)

Agritropic s.a.r.l.

Rue des Moulins

43100 Vieille-Brioude FRANCE

Tel. +33-4-71749790

Fax +33-4-71749282

Contact: Mr Georges Brun
(also acts as Commercial Director for Aarhus out of their Abidjan office.)
email: sla@africaonline.co.ci

Eurobroker
30, rue d'Astorg
75008 Paris FRANCE
Tel. +33-1-44948787
Fax +33-1-40060313
Contact: Mr Michael Becker, Tropical Nuts Division
email: michael@eurobroker.fr

Aarhus Olie Côte d'Ivoire
(subsidiary of Aarhus Oliefabrik A/S, Denmark)
Résidence de la Tour B.I.A.O
8-10 rue Joseph Anoma
(entrée avenue Lamblin)
Abidjan 01 BP 1730
COTE D'IVOIRE
Tel. +225-327052/53
Fax +225-327055
Contact: Mr Søren Laursen, Managing Director
email: ghb@africaonline.co.ci

EXA Cosmetics
112 rue de Lagny
93100 Montreuil FRANCE
Tel. +33-1-42879698
Fax +33-1-48708870
Contact: M. Philippe Monmarché
(Use refined *Shea* butter in their line of cosmetics.)

D2E
202, rue de la Croix Nivert
75015 Paris FRANCE
Tel. +33-1-53785858
Fax +33-1-53785850
Contact: Dr Laurent Sousselier
(Use refined *Shea* butter in their line of beauty creams.)
Fuji Oil Company, Ltd
1-5, Nishi Shinsaibashi 2-chome, Chuo-ku
Osaka 542 JAPAN
Tel. +81-724-631364
Fax +81-724-631601

Contact: Mr Uragami, Manager
email: 780040@so.fujioil.co.jp
(Import *Shea* nuts, butter and oil.)

Fuji Vegetable Oil, Inc.
(US-based subsidiary of Fuji Oil)
120 Brampton Road
Savannah, GA 31408 USA
Tel. (912) 966-5900 x 315
Fax (912) 966-6913

Contact: Mr Don Tanegawa
email: fvo_finance@gapcdr.com
(Imports *Shea* butter and oil only for sale to chocolate manufacturers
in Canada and S. America.)

AFAJATO, Inc.
6455 E. Briar Drive
Lithonia, GA 30058 USA
Tel. (770) 482-4451
Fax (770) 413-6389

Contact: Mr Paul Agbemashior
Email: afajato@aol.com
(Imports *Shea* butter only for sale to health food and arts and crafts stores,
primarily from Ghana.)

The *Shea* Butter Company, Ltd
16781 Torrence Avenue
Lansing, IL 60438 USA
Tel. 1-877-489-2700 (toll free)
Fax (708) 481-3144 or 1-877-489-9917 (toll free)
Contact: Mr. Thom Rivers
Email: trivers@naturalessence.com

Annex 4

Shea processing financial workings for Guru Nanak Oil Mills, Lira.

Assumptions and financial workings

Capital cost budget

Assumed real weighted cost of capital	20%/annum		
	US\$	Years	Annualized cost
Fixed capital costs			
Diesel engine 8HP	1,021	5	341
Crusher	437	5	146
Mill	617	5	206
Bridge presses	1,460	5	488
Building	800	10	191
Tools and other durable equipment	130	10	31
Total	4,465		1,404
Working capital costs:			
Non—raw material (NRM) annual operating costs	11,453		
No. of months NRM operating costs required	0.5		
Raw material annual operating costs	23,468		
Mean raw material storage period (months)	5.8		
Working capital required (US\$)	12,232		
Annual cost of working capital (US\$)	2,344		
Total capital investment (US\$)	16,697		
Total annualized capital cost (US\$)	3,748		

Output budget:

Machine capacity (tonnes nuts/hour)	0.025
Number of bridge presses	4
Operating hours/day	6.0
Operating days/month	21.7
Operating months/year	11.5

Annual *Shea* nut requirement (tonnes)

149.5

Yield dry/raw 0.31

Annual output of *Shea* butter (tonnes) 46.3

Raw material budget:

Annual *Shea* nut requirement (tonnes)

149.5

Cost of *Shea* nuts-(US\$/tonne) 152

Annual raw material budget (US\$) 22,720

Revenue budget:

Annual output of *Shea* butter (tonnes) 46.3

Revenue /tonne (US\$) 600

Total annual revenue (US\$) 27,807

Labor budget:

Type of labor	Persons/ machine	Cost/ man- month	Months worked	Number of machines	Cost
Mill operator	1	35	11.5	1	402.5
Press operator	4	35	11.5	4	6440
Total cost /annum					6842.5

Fuel budget:

Fuel consumption/tonne nuts (liter)

12

Cost of fuel/liter 0.47

Total cost/annum 843

Analysis of profitability	US\$/t	US\$/ annum	US\$/ tonne of product	% of rev- enue
Operating costs-variable:				
Raw material	152/tonne	22,720	490.24	82
Transport of nuts to processing site	5/tonne	747	16.13	3
Fuel		843	18.19	3
Miscellaneous processing materials	19/tonne	2,840	61.29	10
Direct labor		6,843	147.64	25
Packaging of butter	15/tonne	695	15.00	3
Transport of butter to exporter's depot	5/tonne	232	5.00	1
Subtotal variable costs		34,921	753.50	126
Operating costs-fixed:				
Management (US\$200/month)		2,400	51.79	9
Annual processing site rent		20	0.43	0
Storage facilities	20/month	230	4.96	1
Maintenance of machines	30/month	345	7.44	1
Subtotal fixed costs		2,995	64.62	11
Subtotal operating costs		37,916	818.12	136
Contingency-5%		1,896	40.91	7
Total operating costs		39,812	859.03	143
Capital costs		3,748	80.88	13
Total annual costs		43,560	939.91	157
Annual revenue		27,807	600.00	100
Profit (loss) before tax		-15753	-339.91	

About FOODNET

The FOODNET project is a regional agricultural research and development network focusing on market-oriented research and sales of value-added agricultural products.

The overall project goal is to strengthen regional capacity in value-added, agro-enterprise technologies for increased income, improved nutrition, and sustainable food security in eastern and central Africa.

The project purpose is to identify market opportunities for existing and novel, value-added products, and optimize appropriate postharvest technologies to enhance the income generating capacity of small- and medium-scale entrepreneurs from the private sector and promote products to improve nutrition.

FOODNET project partners are ASARECA networks, national programs, Universities, International Agricultural Research Centers, NGOs, CBOs, farmers, processors, manufacturers, and other agricultural sector stakeholders within the ASARECA region.

Researchers working with FOODNET use market survey techniques to identify market opportunities and work in close collaboration with a range of public and private sector partners to develop agro-enterprise projects, using innovative postharvest technologies and products to supply both new and existing markets.

Agro-enterprise activities will be developed using commercial models through the integration of market studies, improved technologies, and the development of partnerships with the various agents involved in the production to sales marketing chain.

To build capacity in this type of research, the network seeks to strengthen links between the private and public sector agencies and provide regional training in market studies and agro-enterprise development to accelerate the process of change towards market oriented research.

Project objectives are to:

- Identify market opportunities for increased sales of value-added products.
- Identify varieties with specific nutritional/processing qualities for germplasm enhancement.
- Identify, adapt, and promote improved postharvest technologies with private sector partners.
- Diversify product range from locally available crops for market expansion and improved nutrition.
- Provide training to strengthen the capacity of the Network to deliver profitable agro-enterprises.
- Develop postharvest information systems for increased access and exchange of information.
- Catalyze the process of change from production to market oriented research in partnership with the ASARECA networks and private sector partners.
- Enhance local, regional, intercenter, and international cooperation in postharvest activities.

About IITA

The International Institute of Tropical Agriculture (IITA) was founded in 1967 as an international agricultural research institute with a mandate for improving food production in the humid tropics and to develop sustainable production systems. It became the first African link in the worldwide network of agricultural research centers known as the Consultative Group on International Agricultural Research (CGIAR), formed in 1971.

IITA's mission is to enhance the food security, income, and well-being of resource-poor people primarily in the humid and subhumid zones of sub-Saharan Africa, by conducting research and related activities to increase agricultural production, improve food systems, and sustainably manage natural resources, in partnership with national and international stakeholders. To this end, IITA conducts research, germplasm conservation, training, and information exchange activities in partnership with regional bodies and national programs including universities, NGOs, and the private sector. The research agenda addresses crop improvement, plant health, and resource and crop management within a food systems framework and is targeted at the identified needs of three major agroecological zones: the savannas, the humid forests, and the midaltitudes. Research focuses on smallholder cropping and postharvest systems and on the following food crops: cassava, cowpea, maize, plantain and banana, soybean, and yam.